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TIME, ACTION & NECESSITY

a proof of free will

Nicholas Denyer

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Are human actions ever free? Or is it instead always determined how people will act, long in advance of any decision they may take? Are indeed those two alternatives inconsistent, or may we maintain that human actions are both free and determined? Nicholas Denyer systematically answers these and many connected questions by elaborating from some Aristotelian insights an elegant and plausible theory of time, modality and practical reasoning. His short and tightly argued book offers a novel refutation of determinism and a novel proof that human beings have free will. Other contentious conclusions it reaches are that determinism entails fatalism, that the idea of timeless truths is a nonsense, and that no fact can possibly be other than it is.

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IN MEMORY OF ARTHUR PRIOR

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1. The various themes touched on in this book include the relation between mind and body, the reality of the future, the nature of modality, and the distinction between theoretical and practical reason. One theme however is in view throughout: this is a proof that human beings have free wills, in what I think is an important sense of that battered phrase. More specifically, the purpose is to prove that our actions are not determined by anything prior to our deliberations; that they are determined solely by our deliberations; and that large-scale physical events are among those over which our free wills are thus exercised. The barest outlines of this proof may be given thus: determinism, however formulated, entails that every detail of the future is fixed and necessary; in deliberating about a matter one assumes however that it is contingent, that there are two possibilities open: a deliberator cannot then consistently believe that his actions are determined by events prior to his deliberations; in deliberation one assumes furthermore that which of the two open possibilities is realised depends upon one's deliberations; no deliberator can then consistently believe that his undetermined actions are merely a random matter; on pain of solipsism every deliberator must concede to all others a freedom of will just like that which he himself possesses; and on pain of a particularly fantastic dualism, he must concede that the free wills of human beings are exercised over large scale physical events. It is in putting flesh upon the bare bones of this proof that we will stray into the variety of topics mentioned at the outset.

2. The view I am arguing for may then be called a *hard libertarianism*. Nevertheless, it is also in many respects conciliatory: some tenets of the position defended here are close to, and others actually identical with, some tenets of deter-

minism. For example, one tenet of my libertarianism might be summarised as saying that every fact there is is a necessary fact (§ 42 below). Now one who proposes a philosophical thesis should, I believe, be able to explain away the views of those who oppose it. The most satisfactory explanation of a belief is that leading elements of it either are true or else are so like the truth that they may readily be confused with it. The conciliatory aspects of my libertarianism therefore enable me to explain away in fine style the beliefs of my opponents. That my libertarianism finds some grains of truth in determinism is then not a defect of it, but a merit. Indeed, I claim it as a general merit of the views presented here that they enable us to give, systematically, similar explanations of a great many other views, not necessarily all opposed to them. The detailed substantiation of this claim will be provided as we proceed.

3. What I understand by determinism may be presented in two ways, both in tenseless and in tensed discourse. In tenseless discourse I take determinism to be, very roughly, the thesis D1 that

> D1 For every stage of the universe there are truths about that stage which, together with some law or conjunction of laws, entail a complete description of every later stage of the universe.

In tensed discourse I take determinism to be, again very roughly, the thesis D2 that

> D2 Every stage in the past or present of the universe is such that there are truths about that stage which, together with some law or conjunction of laws, entail a complete description of the present and every future stage of the universe; and this always has been and always will be true.

For the sake of convenience I will work hereafter to refine only the tensed version of determinism D2. For the sake of simplicity I will hereafter omit the qualification 'or conjunction of laws'; or, what comes to the same thing, I will treat any conjunction of two laws as itself a law. This simplifying assumption is quite implausible if those generalisations are lawlike which are confirmed by favourable instances, in the way in which 'All crows are black' is confirmed by finding black crows. For if that is so, then instances favourable to any one lawlike generalisation would be favourable to, and help confirm, its conjunction with any other lawlike generalisation; and thus instances favourable to any one lawlike generalisation would indirectly confirm any other. But the implausibility introduced by this simplifying assumption need concern us no further; for there are other implausibilities to determinism, and it is on these that we will concentrate.

4. It is not easy to give any formal and precise test for which propositions are about the past, which about the present, and which about the future. For there is a sense, too broad for our purposes, in which every proposition is about the present: every proposition can, without change of truth value, be prefixed by 'It is now the case that . . .'. Moreover, the fact that a proposition is prefixed by an operator signifying the past tense is not for our purposes an adequate necessary and sufficient condition of its being about the past. Although it is not readily explicable, there is an intuitively graspable sense in which 'Tomorrow it will be three days since she was knocked off her bicycle' is about the past and 'It was true yesterday that there would be an eclipse three days later' is not. The same examples would show also that the fact that a proposition is prefixed by an operator signifying the future tense is not for our purposes an adequate necessary and sufficient condition of its being about the future. The problem we are faced with here is not due solely to the fact that we are trying to refine determinism as formu-

lated in the tensed discourse of D2. It recurs also if we try to deal with determinism in the tenseless form D1; for there it recurs in the guise of the problem of whether two propositions describe the same stage of the universe, and of which, if they do not, describes the earlier stage. I mention this problem only to pass it by. It is sufficient that we already understand a narrower sense in which not every proposition is about the present, and in which if 'p' is about the present, then 'It will be that p' and 'It has been that p' are about the future and the past respectively. The fact that these notions of being about the past, present, or future are not readily explicable is no impediment to our using them. If we could use no notion save those that we could completely explicate, there would be little or nothing that we could say. Moreover, if there is no sense, besides the ones found wanting a moment ago, in saying that one proposition is about the past and another about the future, and if, similarly, there is no sense in saying that one proposition describes an earlier stage of the universe than another does, then determinism cannot be stated. For the determinist wants to say more than that for every truth there is some other truth which in conjunction with some law entails the first truth.

5. In giving a formal version of determinism we will use not only these intuitive notions of being about the past, present, or future. We will use also a symbolism to be presented in this section and given some partial explanation thereafter. We will employ, with some modifications, the bracketless Polish notation for modalities and tenses made known by the late A. N. Prior.[1] In its standard form this is as follows: p, q, and

---

[1] This notation is not the only thing that I have borrowed from Prior. The instruction and stimulation that I have received from his brilliant works has been immense: so immense in fact that to document it in further detail would be an almost endless task. Those who know Prior's works will find traces of his influence throughout this book; those who do not can best begin by consulting the bibliography by Olav Flo, appended to A. N. Prior *Papers in Logic and Ethics*, edited by P. T. Geach and A. J. P. Kenny (London 1976).

r are variables for tensed propositions, capable of varying their truth values with the passage of time; the truth-functional operators on these propositions are Np (the negation of p), Cpq (the material conditional 'If p then q'), Kpq (the conjunction of p and q), Apq (the alternation or disjunction of p and q), and Epq (the material equivalence 'p if and only if q'); the quantifiers are Π (universal) and Σ (existential); m, n and o are variables ranging over numbers; the future tense 'It will be in n units of time that p' is symbolised as Fnp, and the past 'It was the case n units of time ago that p' as Pnp; the modal operators are Lp ('It is necessary that p') and Mp ('It is possible that p'). The modifications I will make are these: I will use l and k as variables for lawlike propositions; I will use an operator $\text{Ł}l$, to be read 'It is a law that l'; and I will admit only propositions about the present as permissible substitutes for the variables p, q, and r. This ensures that propositions of the form Fnp and Pnp will be genuinely about the future and the past respectively.

6. Most of the symbolism needs little further explanation. Because however its tense operators will play an important part in what follows, and because tenses play an important part in determinism as formulated in D2, I will expand on the sense to be attached to the tensed propositions Fnp and Pnp.

It is important that the explanation we give of the past and the future tenses should beg no questions about the nature of the past and the future. It should not be such as to commit us immediately to that view of the relations between past and future which is expressed by D2, nor immediately to that view which is expressed by its contradictory. Our symbolism for tenses should be neutral between these different conceptions of time, for only thus can it be used to set out perspicuously the contrasts between them and to formulate, without prejudice, arguments for and against either. Without such a neutral tense logic in which to present their views, those who support and those who oppose D2 will be in grave danger of never coming to grips, and of merely talking through one another instead. Indeed, what holds for the issue between D2 and its opponents holds also for other issues in the philosophy of time; our explanations of the tense operators should enable us to give a perspicuous and unprejudiced account of as many of these as possible. That setting out these issues in an adequate tense logic will not *presuppose* solutions to them does not mean that so setting them out will not *facilitate finding* their solutions. It is possible to answer a question without begging it; and finding the right answer to one's questions is all the easier if one has a symbolism that does not beg them.

7. How then are we to explain our past and future tenses *Pnp* and *Fnp* in a way consonant with this objective? Let me begin by introducing the idea of a *course of history*. By this I mean simply a course which the history of the universe might have taken or might yet take, including thereby the course which it actually has taken. Such a course may be represented diagrammatically by a line running up the page from past to future, as in Figures 1 and 2 below. Each point on that line represents a moment of time in that course of history. A period of time in that course of history is represented by each segment of that line. Each moment and each period of time occurs in each course of history: in each course of history there is a period identical to 19 March 1980 and a moment identical to noon of that day. A moment is represented by a line running horizontally across the page; a moment in a course of history is represented by the intersection of such a line with one of the lines representing a course of history. Two periods of time are of course identical when the moments bounding them are the same, so if two segments of lines start the same distance down and end the same distance up the page then the periods that they represent are identical. At each moment in each course of history, or at each point on the structure of lines, there are true propositions. The propositions which are true at noon on 19 March 1980 in some course of history are exactly those propositions which would have been true at noon on 19 March 1980 had that course of history been the actual one.

Let me now introduce the idea of those courses of history which are *available* at some given moment in some course of history. One course of history is available at a moment in another course of history if and only if whatever is true at that moment in the first course of history is true at that moment in the second. The courses of history available at a point on the structure of lines are represented by those lines which pass through that point. Thus if two lines pass through a point, each represents a course of history that is available at that point and at what it represents, namely, a moment in some course or courses of history. The two available courses of history are, at that moment, indistinguishable.

A variety of views is *prima facie* possible about the relations between different courses of history. If one supposes that there is never more than one course of history available at any moment in any course of history, then one's view may be represented by Figure 1.

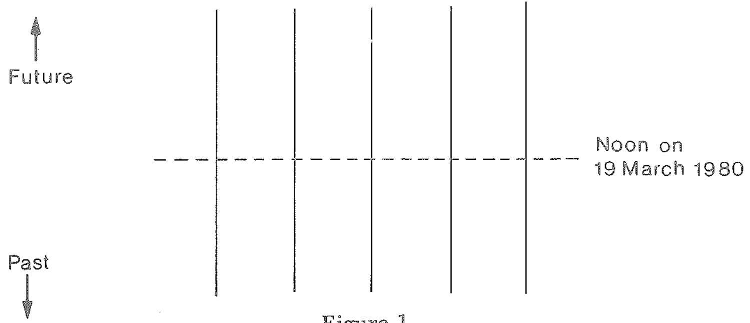

Figure 1.

On this conception, no two courses of history are ever available at any moment in any course of history. At no moment therefore do two courses of history ever have exactly the same propositions true in them. Courses of history are then, on this conception, represented by lines that never meet and are therefore parallel. This is tantamount to supposing that courses which differ in any part have always differed and always will differ in every part, or that they have no differences in their futures without also having differences in their pasts, nor differences in their pasts without also having differences in their futures.

One might deny all this and suppose instead that at some moments there is available more than one course of history. A diagram which represents such a view will have its lines branching rather than parallel. One such diagram is Figure 2, where the lines branch only towards the future.

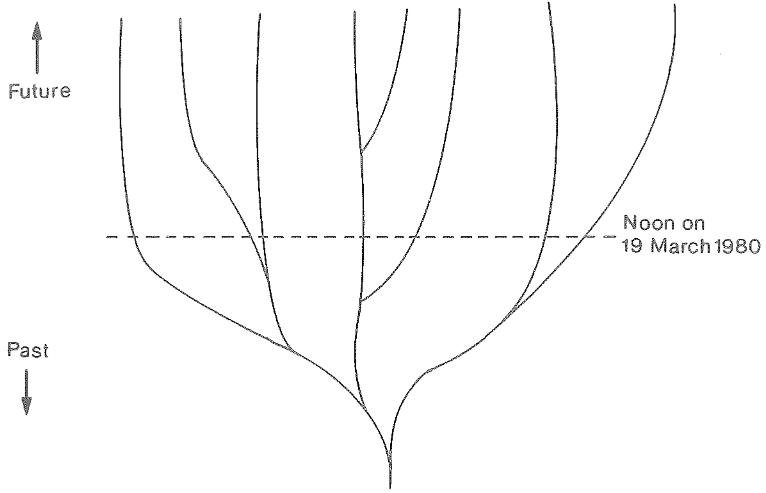

Figure 2

On this conception, any two courses of history available at any moment in any course of history are indistinguishable up to and including that moment; only subsequently do they diverge. Figure 2 does not of course represent the only alternative to Figure 1. One could have a figure with lines branching only towards the past, another with lines branching in both directions, a third where the lines repeatedly all join together and then separate, and so on. I leave the construction of these figures to the reader.

Having thus introduced and illustrated the ideas of availability and of a course of history, we are now in a position to give our long-deferred explanations of the past and future tense operators. They are:

> A proposition Fnp is true at a point on a line if and only if p is true n units above that point on every line which passes through that point.
>
> A proposition Pnp is true at a point on a line if and only if p is true n units below that point on every line which passes through that point.

The tense operators, thus explained, can now be used in formulating the views on the relations between courses of history presented diagrammatically in Figures 1 and 2. This will illustrate how they are used; it will illustrate moreover the capacity of our tense operators to render impartially some rather different views on courses of history and the relations between them. Thus the view presented in Figure 1 may be formulated by the two propositions:

1F $\Pi p \Pi n AFnpFnNp$

1P $\Pi p \Pi n APnpPnNp$

On this conception, only one line runs through a point X, and either p is true n units along that line after X, or else Np is true at that distance along that line. Thus either p is true n units above X on *every* line which passes through X, or else Np similarly is true n units above X on *every* such line. Thus on this conception proposition 1F is true, and true at every point on the structure of lines. Analogous reasoning shows how Figure 1 yields also 1P.

The view presented in Figure 2 is in one way the same and in another different. It agrees with that of Figure 1 about the past, but disagrees about the future. It may be formulated by the two propositions:

$$2F \quad \Sigma p \Sigma n KNFnpNFnNp$$

$$2P \quad \Pi p \Pi n APnpPnNp$$

On this conception, each point has several lines which run through it, for at each moment in a course of history several courses of history are available. Now the lines which pass through a point X diverge above X; for each moment in a course of history there is some subsequent moment such that the courses (or rather some of the courses) of history earlier available are distinct at that later moment. Let us consider such a moment, the moment n units after X, and two of the courses of history available at X which are distinct at that moment n units after X. Since these courses of history are distinct there is some proposition, p, which is true at that moment in the one, and false at that moment in the other. It is therefore not the case that p is true n units above X on every line which passes through X; for Np is true at that distance above X on one of the lines which passes through X. At X it is therefore not true that Fnp, and so it is true at X that $NFnp$. Similarly, it is not the case that Np is true n units above X on every line which passes through X; for p is true at that distance above X on one of the lines which passes through X. At X it is therefore also the case that $NFnNp$. And thus on this conception we have 2F, which by propositional and quantificational calculus reasoning entails and is entailed by the contradictory of 1F. The conception implicit in Figure 2 agrees however with that of Figure 1 as far as concerns the past. Although there are several lines which pass through a point X, they never diverge until after X. Whatever is true n units below X on *any* of the lines which run through it is therefore also true at that distance below X on *every* one of those lines. If there is any line passing through X on which p is true n units below X, Pnp is therefore true at X. If on the other hand there is no such line, then Np is true n units below X on every line passing through X, and $PnNp$ is therefore true at X. And thus on this conception we have 2P.

The reader may care to amuse himself by using the past and future tense operators whose use we have just explained to formulate some of the other views we have mentioned about the relations between courses of history: that they branch only towards the past, that they branch in both directions, that they periodically all converge and diverge. In so amusing himself he will add further confirmation to my claim that the symbolism for tenses that I have been introducing and explaining indeed has the required neutrality between different views about the nature of the past and the future. It will then enable us to ask, and with luck to answer, our questions about the relations between past and future without begging them.

8. Let us now use these resources to formalise D2. For the purposes of my refutation of determinism, only a simplified version of D2 is needed. Besides omitting the qualification 'or conjunction of laws' I propose therefore to omit also all reference to the present, and the latter clause to the effect that what is said in the former always has been and always will be true. The last two omissions, unlike perhaps the former, do not strengthen D2; they leave us instead with something entailed by D2 in its pristine form. To keep within the symbolism already explained, I propose also to render 'p entails q' by $\text{Ł}Cpq$. This also weakens D2; for if p entails q then it is a law, a logical law, that Cpq, even though not every case of $\text{Ł}Cpq$ is a case in which q is entailed by p.

An initially tempting formalisation of determinism would be

$$D3 \quad \Pi p \Pi n \Pi m \Sigma q \Sigma l KPmqK\text{Ł}lA\text{Ł}CKlPmqFnp$$
$$\text{Ł}CKlPmqNFnp$$

The gist of D3 may be given as follows: any proposition about the future Fnp is such that for any stage in the past there is some truth about that stage which in conjunction with some law either entails that proposition about the future

Fnp or entails its contradictory *NFnp*. On deeper inspection however it becomes clear that D3 is quite compatible with something that the indeterminist will wish to assert. One can express the indeterminacy of, for example, whether I will be sitting in ten minutes by saying, in semi-English, that both it is not the case that it will be in ten minutes that I *am* sitting, and it is not the case that it will be in ten minutes that I am *not* sitting; more formally, one can express it by saying that *KNFnpNFnNp*. In the terms of Section 7 above, one can say that there are now available two courses of history, which divide towards the future. Expressing in this way an indeterminacy for the future does not lead one into a contradiction unless *NFnp* entails *FnNp* as well as being entailed by it, unless that is the pair *Fnp* and *FnNp* are contradictories instead of merely contraries. Similarly, one can so express an indeterminacy for the future without violating the law of the excluded middle, unless that law holds to be true not only the disjunction of *Fnp* with its external negation *NFnp*, but also the disjunction of *Fnp* with its internal negation *FnNp*. The trouble with D3 as a formalisation of determinism is that it does nothing to rule out indeterminacies of the sort expressed by *KNFnpNFnNp*, unless something is done to substantiate these large claims about the relations between *Fnp*, *NFnp* and *FnNp*.

9. This is not to say that an indeterminist will wholeheartedly agree with D3, but there is much about it that in a suitably weakened form he might accept. Thus in disagreement with D3 an indeterminist may believe that there are propositions about the future which are entailed by truths about the present in conjunction with some law, but which are not entailed by any truths about the past in conjunction with any laws. More formally this may be presented thus:

$$\Sigma p\Sigma q\Sigma n\Sigma lKKpK\not{L}l\not{L}CKlpFnqN\Sigma r\Sigma m\Sigma k$$
$$KPmrK\not{L}k\not{L}CKkPmrFnq.$$

An indeterminist will hold this on the grounds that there are undetermined facts about the present which determine facts for the future. Similarly, an indeterminist may believe that there are propositions about the future which are entailed by true propositions about the past in conjunction with some law, but which are not entailed by any law in conjunction with any truths about any stage further back in the past. More formally, this may be presented as:

$$\Sigma p\Sigma n\Sigma q\Sigma m\Sigma lKKPnpK\not{L}l\not{L}CKlPnpFmqN\Sigma r\Sigma o\Sigma k$$
$$KPn+orK\not{L}k\not{L}CKkPn+orFmq$$

An indeterminist will hold this on the grounds that there were undetermined facts in the past which have now determined facts for the future.

On the other hand however, in agreement with D3, an indeterminist may well be prepared to accept that a proposition of the form *Fnp* is true if and only if it is entailed by a law in conjunction with either a truth about the past or a truth about the present. More formally, an indeterminist may be prepared to accept that

$$\text{D4}\quad \Pi p\Pi nEFnp\Sigma lK\not{L}lA\Sigma q\Sigma mKPmq\not{L}CKlPmq$$
$$Fnp\Sigma rKr\not{L}CKlrFnp.$$

In short, an indeterminist may accept that the only way a proposition about the future can be true is by something in the past or the present making it true. Indeed, an indeterminist would be well advised to accept D4 or something like it if he is to answer the reasonable request to say just which parts of the future are not determined. For he can then hold it indeterminate whether *Fnp*, that is, he can hold *KNFnpNFnNp* true, if and only if there is no law which in conjunction with either a truth about the past or one about the present either entails *Fnp* or entails *FnNp*.

10. In fact, if the indeterminist has grounds for accepting

D4, he has grounds also for accepting the simpler and stronger thesis that a proposition about the future is true if and only if it is entailed by some truth about the present in conjunction with some law. This simpler and stronger principle is, I take it, that of Chrysippus: 'Those things which do not have causes why they will be cannot be such that they will be true; it is therefore necessary that those that are true have causes' (Cicero, *De Fato* 26). It may be formalised as

$$\text{D5}\quad \Pi p\Pi nEFnp\Sigma q\Sigma lKqK\not{L}l\not{L}CKlqFnp$$

Accepting D4 gives us grounds for accepting D5 because of a principle illustrated by an example of Wittgenstein's. There are two seeds, the first of which came from a pear tree, and the second of which came from an apple tree. Someone tells us that there is no difference whatsoever in the present constitution of the two seeds, and that the only difference between the two lies in their pasts. He adds that nevertheless this difference in their histories alone means that the former seed will develop into a pear tree and the latter into an apple tree. These facts about the histories of the two seeds directly affect their futures, without having any effect at all on their presents. Or so he tells us. I find his claim incredible; action at a temporal distance is a mere fantasy. This example of Wittgenstein's illustrates the principle that if ever a proposition about the future is entailed by a law in conjunction with a true proposition about the past, then it is also entailed by a law in conjunction with a true proposition about the present. More formally, this principle may be put thus:

$$\text{D6}\quad \Pi p\Pi nC\Sigma q\Sigma m\Sigma lKPmqK\not{L}l\not{L}CKlPmqFnp\Sigma r\Sigma k$$
$$KrK\not{L}k\not{L}CKkrFnp.$$

D6 holds in short that any proposition about the future made true by a fact about the past is also made true by a fact about the present. D4 and D6 together yield D5. If therefore an indeterminist is to offer the cumbersome D4 as his criterion for which parts of the future are indeterminate, he might as well offer instead the simpler D5, and say that $KNFnpNFnNp$ is true if and only if there is no fact about the present which in conjunction with a law either entails Fnp or entails $FnNp$. Of course in using, for reasons of its greater simplicity, D5 as his criterion of indeterminacy the indeterminist does not deny D4; for after all D4 does follow from D5. The reason for adopting D5 instead of D4 is that D6 shows D4 to be needlessly elaborate.

11. Need anyone object to D5? Few, I hope, will be troubled by the half of the biconditional holding that if a proposition about the future is entailed by a law and a fact about the present, then that proposition about the future is true. Any fault in D5 will therefore lie rather in the half which holds

$$\Pi p\Pi nCFnp\Sigma q\Sigma lKqK\not{L}l\not{L}CKlqFnp.$$

Accepting this will cause no determinist any qualms, for it is an immediate consequence of D2 in the original form which included reference to the present. Only indeterminists then can have any grounds for objecting to D5. Furthermore, not even every indeterminist can have such grounds. Consider for example an *ultra-radical* indeterminist, that is one who holds that every proposition of the form Fnp is false. He at least will accept that *if* such a proposition is true then it follows from some law in conjunction with a fact about the present. Consider also a *radical* indeterminist, that is one who holds that every proposition of the form Fnp is false where Np is consistent and true where Np is not consistent. He too should not be troubled by D5. For any reasonable tense logic will contain a rule to the effect that if p is a theorem then Fnp too is a theorem. If Np is inconsistent and Fnp is for this reason true, then Fnp is also a theorem. In consequence, it is entailed by some truth about the present in conjunction with some law; for it is entailed by everything.

This leaves us with *moderate* indeterminists, that is those who hold that while in some cases $KNFnpNFnNp$ nevertheless there are also truths of the form Fnp where Np is consistent. Now what can the moderate indeterminist say distinguishes cases where the future is indeterminate and $KNFnpNFnNP$ is true from cases where it is determinate and it is true instead that $AFnpFnNp$? He can hardly reply that there is no further difference between the two kinds of case apart from the bare fact that in cases of the one kind the future is not determinate whereas in cases of the other it is. If there is this difference between parts of the future, there must be something which makes this difference; there must be some principle distinguishing the determinate parts of the future from the indeterminate. Such a principle will give us a condition both sufficient and necessary for the indeterminacy $KNFnpNFnNp$. Now obviously it is a necessary condition for such an indeterminacy that

$$N\Sigma q\Sigma lK\not{L}lKqA\not{L}CKlqFnp\not{L}CKlqFnNp.$$

If this necessary condition is not also sufficient, what else must be added to it to produce a sufficient condition? To put it another way, what other necessary condition would there be for such an indeterminacy? I can think of none which has the slightest plausibility. Any moderate indeterminist who shares my inability should then accept that the obvious necessary condition for indeterminacy is not only necessary but also sufficient. In accepting this however as also a sufficient condition for indeterminacy he accepts D5, and with it of course its consequence D4. Not only determinists then, but also indeterminists of all hues, will accept D4 and D5; for these two propositions contain the solid and, I hope, uncontroversial grain of truth in determinism.

12. Let us now return to formalising D2. How can we reformulate determinism in a way which is not only strong enough to include D5, but which is also, unlike D3, strong enough to deny all the claims that are distinctive of indeterminism? How can determinism be formulated in such a way as to rule out indeterminacies of the form $KNFnpNFnNp$? This can be done by D:

$$\text{D}\qquad \Pi p\Pi n\Pi m\Sigma q\Sigma lKPmqK\not{L}lA\not{L}CKlPmqFnp$$
$$\not{L}CKlPmqFnNp.$$

The gist of D can be given as follows: any proposition about the future Fnp is such that for any stage in the past there is some truth about that stage which in conjunction with some law either entails that proposition about the future Fnp or entails its contrary $FnNp$. D is of course D3 modified by the replacement of its final $NFnp$ with $FnNp$. It follows from D3 on the assumption that

$$\Pi p\Pi nAFnpFnNp,$$

the assumption that the indeterminist denies in claiming that

$$\Sigma p\Sigma nKNFnpNFnNp.$$

Indeed, given this assumption, D is tantamount to D3, and each entails the other. D then, unlike D3, explicitly rules out all indeterminacies for the future, and for this reason it is preferable as a formalisation of determinism.

13. There are various lines of argument for determinism. There is what one might call the *logical* argument. This starts from the premises that whatever is true now was always beforehand such that it would be true now:

$$\Pi p\Pi nCpPnFnp;$$

and that for any time in the future any proposition either will be true then or will be false then:

$$\Pi p\Pi mAFmpFmNp.$$

The former premise is taken to be axiomatic for any tense logic. The latter premise is taken to be simply the law of the excluded middle as applied to propositions about the future. From these two premises it follows that

$$\Pi p\Pi n\Pi mAPnFnFmpPnFnFmNp$$

or more simply that

$$\Pi p\Pi n\Pi mAPnFn+mpPnFn+mNp.$$

According to this line of argument the propositions about the past which determine the future are of the form $PnFn+mp$, and the law in conjunction with which they do this is

$$\Pi p\Pi n\Pi mCPnFn+mpFmp.$$

Something like this line of argument seems to have been troubling Aristotle in the celebrated ninth chapter of his *De Interpretatione*. The first of our two premises seems present in:

> Besides, if it is white now, it was true to say beforehand that it would be white, so that it always was true to say of anything that has happened that it would be. (18b 9–11).

The second of our two premises seems present in:

> If one man says that something will be and another denies this very same thing, it is clearly necessary that one of them is speaking the truth, if every assertion is either true or false. (18a 35–8)

Aristotle attempts to draw deterministic conclusions from each separately, but in a later passage he seems to put them together to something like the effect discussed above:

> For nothing prevents ten thousand years ago one man's having said that this will be and another's having denied it, so that whichever of them it was true to say then will be of necessity. (18b 33–6)

It may be objected that a proposition of the form $PnFn+mp$ in spite of its initial tense operator is nevertheless not about the past in the strict sense that was discussed in §4 above; and that it is not so especially where the simple p is, in the strict sense, about the present and Fmp is thus about the future. No proposition, one might object, which is about the past and the past alone, can by itself entail any proposition which is in the strict sense about the future; the mere fact that a proposition by itself entails a proposition about the future

shows that it is not about the past. $PnFn+mp$ however does by itself entail the proposition about the future Fmp. For the law

$$\Pi p\Pi n\Pi mCPnFn+mpFmp$$

is a law of logic which therefore need not be assumed as an extra premise in any inference from the former to the latter. $PnFn+mp$ is not then about the past, and so showing that

$$\Pi p\Pi n\Pi mAPnFn+mpPnFn+mNp$$

does not in the least serve to establish D.

There is however a ready reply to this objection. The logical determinist may grant that $PnFn+mp$ is, where p is about the present, not itself strictly about the past. But he can then appeal to our principle D5, which held that a proposition about the future Fnp is true if and only if it is entailed by some proposition about the present in conjunction with some law. If therefore a proposition about the future ever was true at some time in the past, then there must have been some truth about that time in the past which in conjunction with a law entailed that proposition about the future. More formally:

$$\Pi p\Pi n\Pi mCPnFmp\Sigma l\Sigma qKPnqK\not{L}l\not{L}CKlqFmp.$$

So while a proposition of the form $PnFn+mp$ is not itself in the strict sense a truth about the past, its truth does require that there be a truth Pnq which is in the strict sense about the past and which does, in conjunction with a law, entail Fmp. Logical determinism may thus be supplemented to meet this objection.

Thus supplemented by D5, the logical argument for determinism comes to resemble one of the arguments of Chrysippus:

> If there is motion without a cause, then not every proposition (which the dialecticians call an *axioma*) will be either true or false; for that which will not have causes making it happen will

> be neither true nor false; but every proposition is either true or false; there is therefore no motion without a cause. And if this is so, whatever happens happens through preceding causes: if this is so, everything happens by fate. It is shown therefore that whatever happens happens by fate. (Cicero, *De Fato* 20–1)

14. There is also what one might call the *theological* argument for determinism. This starts from assuming the eternal existence of an omniscient God. God's omniscience is then taken to require that if p is true now he always knew for ever beforehand that it would be true now. If we add to our symbolism the propositional operator Dp, to be read 'The Deity knows that p', this may be formalised as

$$\Pi p \Pi n C p P n D F n p.$$

More generally, divine omniscience is taken to require that God always knew the whole of the future. This assumption may be formalised as

$$\Pi p \Pi n \Pi m A P n D F n+m p P n D F n+m N p.$$

The facts about the past which determine the future are then of the form $PnDFn+mp$; and the law in conjunction with which they do this is 'If anyone knows that p, then p'.

Something like this line of argument seems to have been at the back of the medieval debate on God's knowledge of future contingents. See for example Boethius' *De Consolatione Philosophiae* lib.5 prosa 3 and the following sections; Aquinas' discussion in the *Summa Theologiae* Ia, 14, 13 of the question 'Whether God has knowledge of future contingents'; and William of Ockham's *Tractatus de praedestinatione et de praescientia Dei et de futuris contingentibus*.

Once more it may be objected that a proposition of the form $PnDFn+mp$ is in spite of its initial tense operator nevertheless not in the strict sense about the past. The reasons for making this objection would be the same as those for objecting that the simple $PnFn+mp$ is not about the past either: one may validly infer Fmp from the single premise $PnDFn+mp$, and so that single premise cannot be about the past in the strict sense that is necessary.

Once more however there is a ready reply to this objection. Even if $PnDFn+mp$ is not itself about the past, nevertheless it cannot be true unless there is some fact Pnq which in conjunction with a law entails Fmp. My argument for this relies on the conditions that must be satisfied for there to be knowledge of the future. How then can one know a proposition about the future Fnp? I can think of only two ways. One is by knowing independently of some law and some fact about the present or the past which together entail that proposition about the future. Note that one can have this understanding of foreknowledge, and thus suppose that it can be *known* that Fnp only where Fnp is entailed by facts in the present or past in conjunction with laws, without accepting D4 or D5, and thus supposing that this is the only way in which Fnp can be *true*. If this then is the way in which God knows the future, divine foreknowledge at an earlier time about a later requires that at or before that earlier time there is a fact which in conjunction with a law entails that fact about that later time. Note that given this understanding of how divine foreknowledge works, and given also that

$$\Pi p \Pi n A D F n p D F n N p,$$

we can devise an argument for D5 independent of those presented in §11 above.

Another way of knowing about the future is the way in which one knows of one's own future actions: deciding to make it the case that Fnp is, barring accidents and complications, sometimes sufficient for one to know that Fnp. The accidents and complications that I have in mind are all things which mean that one's decisions may not be successfully carried out. For example, it may not after all be within one's power to bring it about that Fnp; one may suffer from weakness of will; and where Fnp is not about the immediate future there is often the possibility that fresh information will lead one to revise one's decision to make it the case that *Fnp*. Where there are no such accidents and complications, it seems that the fact about the past that I have decided to make it that *Fnp*, in conjunction with other facts about the present or the past and some law, entails *Fnp*. Furthermore, not one of these complications would stop God knowing that *Fnp* on the grounds that he had decided to make it the case that *Fnp*; for God at least would not, e.g., mistakenly take something to be within his power. If this is the way in which God knows the future divine prescience at an earlier time about a later again requires facts at or before the earlier time which fix facts for the later one. These facts are God's decisions at or before that earlier time as to how that later time is to be. On this understanding of it divine prescience is then tantamount to divine preordination.

It is sometimes suggested that there is a third way of knowing about the future. This is the way that people have in mind when they debate 'precognition', meaning by that not just any knowledge of the future however obtained, but an *effortless* knowledge which simply comes to one without one's having to make use of either of the two means outlined above. Belief in precognition is an unhealthy piece of wishful thinking: it is the symptom in epistemology of the desire to get something for nothing. It is no accident that belief in precognition flourishes alongside belief in psychokinesis, the belief that one can get things to move without doing anything other than merely wishing them to move. Let us suppose however that there is such a thing as precognition and that God's knowledge of the future takes this form. Now precognition in the present of the future is not perhaps so obvious as the two other kinds of foreknowledge in requiring that there be facts about the present or past which necessitate the future fact that is precognised. Nevertheless, there is an argument, resting on D5, to show that this is required by precognition, no less than by the other kinds of foreknowledge. If someone knows, by precognition or for that matter in any other way, that *Fnp*, then *Fnp*; but if *Fnp*, then by D5 there is a fact in the present which in conjunction with a law entails *Fnp*; divine precognition of a fact about the future means then that the fact about the future is determined by a fact about the present in conjunction with a law. And if God has always precognised the whole of the future, there have always, at every stage of the past, been facts about that stage which in conjunction with laws entail a complete description of the future. This argument from D5 can of course be added to my other arguments to show that the other two kinds of foreknowledge require that there be facts about the present or past which in conjunction with laws entail the future fact that is foreknown.

15. There are finally what one might call *scientistic* arguments for determinism. The first of these argues *a priori* from the premises that science is without mistaken presuppositions, and that science presupposes every event to have a cause. This presupposition is then interpreted as meaning that every truth has a deductive-nomological explanation, being entailed by some true statement about prior conditions in conjunction with some law or laws of nature. Another of the scientistic arguments is *a posteriori*. It starts from the success of scientists in discovering some deterministic theories which deal with some aspects of some things, and from this infers that scientists will one day have discovered deterministic theories dealing with every aspect of every thing. The facts about the past which determine the future are then of the form *Pnp*, where *p* is, in our narrow sense, about the present; and the laws in conjunction with which they do this are laws whether physical, economic, psychological, etc., of the kind discovered by successful scientists. Because of this, the scientistic arguments for determinism do not require supplementation in the way that the logical and theological arguments do.

Scientistic determinism is perhaps the form that has been found most plausible in modern times; so plausible in fact that many people mean it alone when they use the name 'determinism'. It has however been found appealing at other times too. Some of the ancients found great support for determinism in the predictive successes of divination by oracles.[1] There was of course a certain *naiveté* in this attitude. Nevertheless, it is rather more convincing to draw deterministic conclusions for human actions from oracular predictions about human affairs that succeed in spite of all attempts to thwart them than it is to draw such conclusions from the predictive successes of, say, astronomy.

16. My three categories of logical, theological, and scientistic determinism are not meant to be both exhaustive and mutually exclusive. Theological determinism for instance seems to presuppose some other kind of determinism such as logical or scientistic determinism. God's omniscience would not mean that n units of time ago he knew that $Fn+mp$ or else knew that $Fn+mNp$, unless one or other of these was true n units of time ago; for omniscience does not mean knowing literally everything, but merely (merely!) knowing all that is true. Divine omniscience would then enable us to justify the thesis that

$$\Pi p \Pi n \Pi m APnDFn+mpPnDFn+mNp$$

only if we had some independent argument for the thesis

$$\Pi p \Pi n \Pi m APnFn+mpPnFn+mNp.$$

Logical determinism moreover seems to require the truth of something like scientistic determinism. For when logical determinism is, as we saw in § 13 that it must be, supplemented by D5, it seems to have something very like scientistic

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[1] See for example the passages that von Arnim collected under the heading 'Vaticinatio probat fati necessitatem' ('Sooth saying proves the necessity of fate') in his *Stoicorum Veterum Fragmenta* (Lipsiae 1905–24).

determinism as its consequence. There is then some justification for the modern tendency to regard scientistic determinism as the most serious threat of the three. But while it may not provide us with both exclusive and exhaustive categories, this survey of the traditional lines of argument for determinism shows nevertheless that D adequately captures the intended import of all the major deterministic arguments, logical, theological, and scientistic. Our refutation of D will therefore refute them all.

17. Let us then proceed to derive from D the first of the consequences that I alleged determinism to have, namely that every detail of the future is fixed and necessary. We will abbreviate by Fnp some proposition about the future, for example 'In ten minutes time I will be sitting'. Now D assures us that for every stage in the past there is some truth about that stage which, together with some law, either entails Fnp or entails $FnNp$. Let us consider a typical moment of the past, and call it the moment that happened m units of time ago. We can infer from D that there is a truth about that moment which in conjunction with a law either entails that Fnp or entails that $FnNp$. Let that truth and that law be Pmq and $\not{L}l$ respectively. Now since all laws are necessary, we have Ll. Similarly, since all truths about the past are necessary, we have $LPmq$. The conjunction of two necessary truths is itself a necessary truth, and so from Ll and $LPmq$ there follows $LKlPmq$. Now from D we have

$$A\not{L}CKlPmqFnp\not{L}CKlPmqFnNp.$$

Assume the first disjunct of this disjunction, that is assume

$$\not{L}CKlPmqFnp.$$

From this it follows that

$$LCKlPmqFnp,$$

by the principle invoked earlier that all laws are necessary.

Now by the principle that whatever follows necessarily from a necessary truth is itself necessary, from this and our previous result $LKlPmq$ we can infer that $LFnp$. Now because of the incompatibility of Fnp and $FnNp$ it is true that

$$LCFnpNFnNp.$$

From this and $LFnp$ we can infer, again by the principle that whatever follows necessarily from a necessary truth is itself necessary, that $LNFnNp$. From this there follows $NMFnNp$. From this in conjunction with $LFnp$ there follows

$$KLFnpNMFnNp.$$

And from this in turn there follows

$$AKLFnpNMFnNpKLFnNpNMFnp.$$

We may introduce quantifiers into this to remind us of the generality of this result, and thus we find

$$\mathrm{D}^* \quad \Pi p \Pi n AKLFnpNMFnNpKLFnNpNMFnp.$$

D* also follows by an analogous process from

$$\not{L}CKlPmqFnNp,$$

the second disjunct of

$$A\not{L}CKlPmqFnp\not{L}CKlPmqFnNp.$$

D* therefore follows from D.

According to D* there are not now two possibilities open to me, the one of being seated, the other of not being seated, in ten minutes time. However they might appear to me through the distorting spectacles of my indeterminism, only one of these is a genuine possibility, and whichever of them is the genuine possibility is also a necessity, for the apparent alternative to it is, according to D*, impossible.

18. There are two steps in this argument which might be found controversial. The first is the move from $\not{L}l$ to Ll; the second is the move from Pmq to $LPmq$. They would indeed be invalid were L to be read as 'It is *logically* necessary that . . . '; but not every necessity is a logical one. This is recognised by those determinists who try to shun their commitment to the view that nothing could ever have been other than it is. Assuredly, those who write articles arguing that in spite of determinism people could still have done other than they did are not so foolish as to fear that their determinism has proved every detail of the universe to be *logically* necessary. All then that my argument requires is that laws and propositions about the past are necessary, not that they have the necessity of logical truths.

Once it is clear that I am not claiming all laws to be logically necessary, my claim that laws are in some way necessary should, I think, be widely acceptable. Even Quine, that stern critic of modality, restricts his attack to the logical brand.[1] There may perhaps be some philosophers who cannot make sense of the claim that there is a necessity attaching to some among true generalisations, and that these are the lawful ones. Such philosophers will in consequence abandon the thought that there are any such things as laws at all. They would, I think, be mistaken, but that is a point we need not argue here. For our present concern is with the refutation of determinism, a doctrine which does make the claim that there are such things as laws, and a doctrine to which no such philosopher will therefore subscribe.

That there is a way in which truths about the past are necessary is not perhaps so obvious. When I call the past necessary I mean what Aristotle meant by his similar remark:

> What has happened does not have the possibility of not having happened. Hence Agathon is right to say 'For of this alone even God is deprived, to make not to have happened whatever has been done'. (*EN* 1139b 8–11)

What has happened has happened, and no power on earth

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[1] W. V. O. Quine *Word and Object* (Cambridge Mass. 1960) pp. 196–7.

(or for that matter in heaven, as Agathon reminds us) can now make it not to have happened. Assuming the necessity of the past well explains the incorrectness of blaming someone for failing to alter it. For you cannot correctly blame someone for failing to do something unless there is a possibility of his succeeding; and if the past is necessary, then the project of altering it is doomed to failure. In saying that it is not correct to blame anyone for not now *preventing* its having been that p, I do not imply that it is incorrect to blame him for its having been that p. Blame may be correct if he had been in the past able to stop its coming about that p; but the fact that he had been at an even earlier time able to stop its being later that p does not mean that he is now able to stop its having been that p. Saying that Pnp and therefore $LPnp$ does not commit one to denying that $\Sigma mPm+nNLFmp$. Assuming the necessity of the past also helps explain the oft-discussed fact that causation does not run backward, that effects do not precede their causes. For on the most plausible view of causation,[1] causing is a matter of manipulating and controlling the world, the causes of an event being just those handles that we, and perhaps non-rational agents, can use to prevent, produce, or interfere with it. Now if causation is a matter of manipulation, and if the past is necessary and so not open to manipulation by anyone, then this well explains why effects never precede their causes. There is then no need here to take exception to my argument from D to D*.

Nor is there any need to object that 'Necessarily' or L is being used ambiguously if it is applied not only to the laws of logic, but also to other laws, and indeed to truths about the

past as well. The non-truth-functional operator 'It is interesting that . . . ' can be applied to each of the three without ambiguity; and the insertion of a qualificatory adverb as in 'It is historically interesting that . . . ' does not serve to mark a special sense of 'interesting', any more than does the qualificatory adverb 'very'. Our L is similarly unambiguous; an adverb such as 'logically' does not signal a peculiar sense in which the operator applies only to the truths of logic.

19. Section 17 did then prove D to entail D*. On the further assumption, granted by D2, that D always has been true, it readily follows moreover that D* also always has been true. More formally, determinism entails that

$$\Pi mPm\Pi p\Pi nAKLFnpNMFnNpKLFnNpNMFnp.$$

If therefore I was sitting ten minutes ago, there never was any possibility beforehand that I would not be sitting then; and in general whatever happened could never have happened otherwise, but was always beforehand bound to happen. More formally,

$$\Pi p\Pi nCPnp\Pi mPm+nLFmp.$$

20. That determinism has these consequences should scarcely be controversial. Some excuse is perhaps therefore needed for making so obvious a point at so great a length. The excuse is that the point has often been denied. Thus it is often suggested that 'He would have done otherwise if he had tried' entails 'He could have done otherwise', and that since the former proposition is obviously compatible with determinism, the latter is too. Now I did not this morning perform Houdini's feat of being handcuffed, festooned in chains, locked into a trunk, and submerged in water, only to emerge unscathed. Indeed, being a cautious sort of person I would not even dream of trying to perform that feat unless I knew for sure that I would succeed. From which it follows that if I had tried to do otherwise I would have succeeded. But all the

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[1] One that heeds the strictures of Russell against taking the notion to have much place in advanced science, and that therefore follows the line adumbrated in Gasking and perhaps Collingwood, taking causation to be instead a much more animistic notion. See Bertrand Russell 'On the notion of cause', *Proceedings of the Aristotelian Society* 13 (1912–13)1; R. G. Collingwood 'On the so-called idea of causation', ibid., 38 (1938) 85; and D. Gasking 'Causation and receipes', *Mind* 64 (1955) 479.

same I could not have done other than I did and perform Houdini's feat. Obviously, this example does not refute all the other attempts by determinists to find some truth in 'He could have done otherwise'. It might take much tedious work to show the fault in each of them. But there is a fault we are assured by the proof presented in §§17–19.

21. In § 43 below I will refute D by showing that no rational agent can consistently believe in its consequence D*. In doing so I will employ a principle to be established in the intervening sections. This concerns the relations between deliberation and modality. Philosophers have recently tended to train their attention upon purely logical necessities and possibilities.[1] Perhaps this is because they have been professionally concerned with the discovery of logical necessary truths, and professionally liable to move into the second-order investigation of an enterprise rather than conduct investigations within that enterprise itself. Also influential has been the belief that 'the only necessity that exists is *logical* necessity'.[2] There are however many modalities besides the logical.[3] One need give no more than a few examples. There is an epistemic necessity: what is known is in a way necessary. There is a so-called natural necessity: something can be necessary because it follows from a law of nature. There is a modality of coercion: sometimes one has to do something because one is forced to. All these modalities come as interdefinable pairs. They each come as a pair consisting of a necessity and a possibility operator for which the following equivalence holds: 'necessarily . . . if and only if not possibly not . . .' This and further formal analogies between the modalities, and also between them and other concepts, were explored by Richard Montague in his paper 'Logical necessity, physical necessity, ethics and quantifiers'.[1] The central analogy between all the modalities, and the one to be explored here, lies in their common connexion with deliberation.

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[1] One example is Alvin Plantinga *The Nature of Necessity*, (Oxford 1974); another is the bulk of the papers in Leonard Linsky (ed.) *Reference and Modality* (Oxford 1971).

[2] Ludwig Wittgenstein *Tractatus Logico-Philosophicus*, translated by D. F. Pears and B. F. McGuinness (London 1971) 6.37. Compare also 6.375: 'Just as the only necessity that exists is *logical* necessity, so too the only impossibility that exists is *logical* impossibility.'

[3] Professor G. E. M. Anscombe first drew their huge variety most forcefully to my attention, thus goading me into finding the point of connexion between them all that I will present here: I doubt that she agrees with all that she has stimulated me to say.

22. Before going on to present, elaborate and defend this thesis about modality, it will be as well to set out briefly the conception we will employ of deliberative or practical reasoning. By practical reasoning I understand reasoning directed towards the formation of goals, plans, intentions, and in general decisions to do or not to do something. Following Kenny,[2] I adopt the term 'fiat' as a compendious name for all these things. Note that the fiats which one accepts do not include every wish, desire, or fancy which one has. I would for example like to come across buried treasure by accident. This is however hardly something that one can plan, intend, or decide to do, and for this reason it is not one of my fiats to come, accidentally, across buried treasure. Similarly, not every piece of reasoning that is directed towards the formation of a wish is a piece of practical reasoning. One is not reasoning practically when one sets oneself to decide which six characters from fiction one would most like to have to dinner.

How does deliberation, thus conceived as the rational formation of fiats, connect with action? What makes practical reasoning *practical*? Sometimes in the course of deliberation the deliberator reaches a fiat that he takes himself to be able to put into practice immediately, or at will. By such a fiat I mean one that the deliberator supposes he can act on at once without any further deliberation. An example would be my decision now to type this letter: *A*. Unlike someone who is unfamiliar with typewriters, I do not, after deciding to type an *A*, continue by wondering how to do that, which key to strike, and so on. Now when the deliberator reaches a fiat that he supposes he can act on at once without further deliberation, straightaway he attempts to put that fiat into practice. Thus when I decide now to type an *A*, straightaway I try to type an *A*. Indeed, my inferring the fiat 'Let me ϕ', where I suppose that I can put that fiat into practice at once without further deliberation, seems itself to be *identical* with my attempt at ϕ-ing. Now to attempt or to try to ϕ is to do something; it is, in particular, to do something with the hope that in doing it one is ϕ-ing. And where an attempt to ϕ is successful, that attempt seems to be in turn *identical* with an act of ϕ-ing. It is this that makes practical reasoning practical: to act is to draw the conclusion of some practical syllogism:[1] and the conclusion is the action itself, not a mere belief that the action ought to be performed.

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[1] Reprinted in *Formal Philosophy: Selected Papers of Richard Montague*, edited and with an introduction by Richmond H. Thomason (New Haven and London 1974).

[2] A. J. P. Kenny 'Practical inference' *Analysis* 26 (1966) 65. I have borrowed more than this name from Kenny. I have also found extremely helpful P. T. Geach 'Dr Kenny on practical inference' ibid. 26 (1966) 76.

23. How then does one infer a fiat? What sort of premises are needed, and what forms can a valid argument from them take? If one is to infer a fiat from a set of premises, then that set of premises must at least contain some fiat among them. If this were all that were meant by the slogan about not getting an *ought* out of an *is* that slogan would be quite correct. No fiat can be inferred from indicative premises alone; and it is probably an obscure recognition of this fact which has conferred such popularity on that slogan. What conditions must then be met for one to infer the fiat 'Let it be that *p*' from the fiat 'Let it be that *q*'? There seem to be three; each individually necessary and, I conjecture, jointly sufficient.

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[1] The alert reader will have discerned once more the influence of Aristotle. See *De Motu Animalium* 701a22–3.

In the first place one needs also the indicative premise that if *p* then *q*; one needs in other words the indicative premise that the realisation of the plan which is inferred would mean the realisation of the plan from which it is inferred. To be more precise, one needs premises from which the conditional 'If *p* then *q*' follows; and where of course the conditional is a theorem of logic, any premise will do. Thus one may not infer from a decision to be in London by 6.30 a decision to take the train to London at 4.30, unless one also has premises from which it follows that taking that train to London will get one there on time. It should be emphasised that having also premises from which it follows that 'If *p* then *q*' is only a necessary condition for being able to infer 'Let it be that *p*' from 'Let it be that *q*'. It is not also sufficient, for not everything of the form:

Let it be that *q*

If *p* then *q*

Therefore, let it be that *p*

is a valid practical inference. For example, if I take the 4.30 to London and eat a £10 note I will be in London by 6.30; however, I can hardly infer from this and my original decision to be in London by then a decision to take the 4.30 train and eat a £10 note. Such counter-examples to the theory of practical reasoning that would ensue if this first necessary condition were claimed also to be sufficient are avoided by the theory presented here. For this theory holds that there are other necessary conditions besides the first for a piece of practical reasoning to be correct.

The second necessary condition for validly inferring 'Let it be that *p*' from 'Let it be that q' is this: one must not accept any other fiat 'Let it be that *r*' which is such that one accepts premises from which it follows that 'If *p* then not–*r*'.

Violating this second condition would be the fault in my inferring 'Let me take the 4.30 train and eat a £10 note'. I accept for instance the fiats 'Let me not waste money' and 'Let me keep myself healthy', and I accept also beliefs from which it follows that taking the 4.30 train and eating a £10 note would lead to thwarting those fiats: '£10 notes are money, and to eat money is to waste it', '£10 notes are paper, and to eat paper is unhealthy'. Had I no such extra beliefs and fiats the inference would have been valid. The second necessary condition means that a practical inference is importantly unlike a deductive one. A valid deductive inference cannot be rendered invalid by the addition of further premises, whereas a practical inference can.

The first two necessary conditions are not however jointly sufficient. For there is also a third necessary condition for the validity of the inference of 'Let it be that *p*'. One must have also the premise (or premises from which it follows) that one can bring it about that *p*. Suppose that I attempt to infer from my original fiat the fiat 'Let me sprout wings and fly to London this afternoon'. Neither of the first two conditions would rule out this inference as incorrect. For I have the belief that if I sprout wings and fly to London this afternoon, I'll be there by 6.30; and there is nothing in my other beliefs which means that sprouting wings and flying would frustrate any of the other fiats that I accept. Nevertheless, I do not believe that it is within my power to grow wings; neither immediately within my power, in the way in which I suppose it to be within my power to type an *A*; nor even indirectly within my power, in the way in which I suppose it to be within my power, by exercise, to grow bigger muscles. Because I do not believe this, I may not validly infer the fiat 'Let me sprout wings, etc.'; for I need that further premise to do so, and it is a premise that I do not accept.

24. I have drawn some contrasts between practical and deductive reasoning. They should not be taken to imply that all

theoretical reasoning is deductive. Theoretical reasoning employs also inductive arguments, and such arguments have to meet standards almost exactly parallel to the standards that we suggested practical arguments must meet. To infer inductively some belief, one needs at least an indicative premise: if one cannot get an *ought* out of an *is*, similarly one cannot get an *is* out of an *ought*. To continue the analogy, one cannot inductively infer *p* from *q* unless first one has also premises from which it follows that if *p* then *q*, secondly one has no other beliefs from which it follows that *r* and if *p* then not–*r*, and thirdly one believes that *p* may be true.

25. It is the need for practical inferences to satisfy the third condition we mentioned that will be our main concern, for it is here that the connexion between modality and deliberation lies. If I am to accept the fiat 'Let it be that *p*', I must assume that it is within my power to bring it about that *p*. From this assumption it follows that it is possible that *p*; for one cannot bring about the impossible. From this assumption it follows also that the negation of *p* too is possible; for one cannot bring about the necessary either. If then it is within my power to bring it about that *p*, it is a contingent matter whether *p*, and *p* is neither necessary nor impossible. The converse of course does not hold. It is neither necessary nor impossible that I'll come across buried treasure by accident. Nevertheless, I can hardly bring that about; and my belief that I cannot bring that about is the deeper explanation of why it is not among my fiats to come, accidentally, across buried treasure.

26. In deliberating therefore one assumes the existence of contingencies. This is what Aristotle had in mind in his remark:

> Nobody deliberates about those things which do not have the possibility of being otherwise. (*EN* 1139a 13–14; cf. *De Int.* 18b 31)

Strictly speaking of course this is incorrect; would-be squarers of the circle have deliberated at great length about how to achieve an impossibility. But it remains true that one does not deliberate about whether to do something when one believes that doing it is necessary, nor does one deliberate about whether to do a thing when one believes that doing it is impossible. If a thing is not possible, then there is an error in any piece of deliberative reasoning the conclusion or a premise of which is a fiat that one is to do that thing. Furthermore, not only deliberating whether, but also deliberating how, when, where, etc., to do a thing is in error if that thing is not possible. By contrast, although deliberating whether to do a thing is in error if that thing is necessary, deliberating how, when, where, etc., to do it is not in error, unless of course it is necessary not only that one does that thing, but also that one does it thus, then, there, etc. The contrast is unproblematic and readily explained. From *Lp* it does not follow that *LKpq*, nor does it follow that *LKpNq*. If therefore it is necessary to do something, it does not follow that it is necessary to do it and do it thus; nor does it follow that it is necessary to do that thing and do it in some other way. Even though it is necessary to do something, it may then still be within the scope of deliberation whether to do it thus or not. From *NMp* however it does follow that *NMKpq*, and also that *NMKpNq*. If therefore it is impossible to do something, it is impossible to do that thing and do it thus; and it is impossible also to do that thing and do it in some other way. In consequence, if something is impossible, it is not within the scope of deliberation whether to do it thus or not. To call something impossible is then to exclude it from deliberation, and this holds regardless of the kind of impossibility one is dealing with, whether logical, mathematical, physical, or whatever. It is, I suggest, their common connexion with deliberation which makes talk about the different kinds of impossibility something more than a poor pun like talk about the different kinds of banks, some of which are to do with money, and others with rivers. Indeed, one might go so far as to say that there is only one kind of impossibility, which is something that excludes things from deliberation, and that there are various reasons why a thing may be so excluded – logical, mathematical, physical, or whatever.

27. This account of the modalities, whereby they all share a common connexion with deliberation, receives much support from the treatment we can now give to a variety of issues touching on the links between the two. One cannot deliberate, save under a misapprehension, about whether to obey one of the laws of nature. Someone who wonders whether to travel faster than the speed of light is clearly in error. What his error is can easily be explained by this account of the modalities in conjunction with our argument (§ 18 above) that laws are necessary. Since it is a law that nothing travels faster than the speed of light, it is impossible for him to travel faster than the speed of light. But since he is deliberating whether to do that he is assuming that it is possible for him to do it. And this is his mistake.

28. Consider also the fact that there can be no deliberation about the past. As Aristotle puts it:

> Nothing that has happened is an object of choice; for example, nobody chooses to have sacked Troy. For one does not deliberate about the past . . . (*EN* 1139b 5–8)

This does not deny that one can have *wishes* or *desires* about the past. What was once a fiat for the future: 'Let me make a good impression at this coming interview' can subsequently be reincarnated as a desire about the past: 'I hope I made a good impression', or, on hearing news of the outcome, as an emotion: 'I'm glad I made such a good impression.' But once a fiat is about the past it is no longer a fiat. Crying over spilt milk may make sense, but deciding not to have spilt it does not. This is easily explained by my thesis about modality and deliberation. There are, as we saw above (§ 18) no contingencies in the past. Yet in deliberation one assumes the existence of a contingency. It is then the falsehood of this assumption that makes deliberation about the past erroneous.

29. It needs no argument, I trust, to show that not only the past but also the present is outside the scope of deliberation. We have shown the necessity of the past. Can any justification be given for the analogous thesis about the present, that every truth about the present too is necessary?[1] If one can, this will add further confirmation to my claim about modality and deliberation; for that claim will then be able to use the necessity of the present to explain why there is no deliberation about it. Such confirmation is forthcoming; a justification can be given for the thesis that whatever proposition about the present is true, is necessarily true.

Let it be quite clear what this thesis is. I will not be arguing for the theses that $\Pi pLCpp$ and that $L\Pi pCpp$. They would not serve my purposes, and in any case are too obvious to need argument. What I will argue for is rather the thesis that $\Pi pCpLp$, or to put it another way, that $\Pi pCpNMNp$, the thesis that if p is true, then it is not possible that p is false. This thesis is perhaps more surprising than the pair of trivialities with which it might be confused. It is however much less surprising than a third thesis with which confusion is also possible. This third thesis is: if p is true, then it *never was* possible that p should now be false, or equivalently, it *always was* necessary that p should now be true. This third thesis is to be formalised as

$$\Pi pCp\Pi nPnLFnp.$$

It claims that if a proposition about the present is true now, it *never could have been* false now. This however is not claimed by $\Pi pCpLp$, which claims merely that if a proposition

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[1] Perhaps this thesis was accepted by Aristotle, though it is with great diffidence that one offers any interpretation of texts so obscure as *De Interpretatione* 18a28–9 and *Rhetoric* 1418a1–5.

about the present is true now, then it *cannot* now be false; and to say that any possibility of its being false has now been closed off does not imply that no such possibility was ever open. $\Pi pCpLp$ denies then that there are truths about the present which may be false; it does not deny that there are truths about the present which might have been false.

On deterministic assumptions a proof that $\Pi pCpLp$ can readily be given. It is a consequence of D2 in its original form that included reference to the present that:

$$\Pi pCp\Pi n\Sigma q\Sigma lKPnqK\not{L}l\not{L}CKlPnqp.$$

In words this may be rendered as: every truth about the present is such that at every stage of the past there was a truth about that stage which in conjunction with a law entails that truth about the present. Now take a typical proposition p about the present, and assume it to be true. Take also a typical moment of the past, the moment that took place n units of time ago. On this deterministic assumption there is a truth about that stage Pnq and a law l, the conjunction of which entails p. But since each of Pnq and l is necessary, so too is their conjunction, and so too is what follows from their conjunction. On this deterministic assumption we have therefore $CpLp$. And on introducing a quantifier we have what was to be proved, namely $\Pi pCpLp$.

A proof based on deterministic assumptions will hardly however convince indeterminists. What then can be done to convince them? There is an argument which invokes Saul Kripke's ideas of a possible world, of accessibility, and of a necessary truth as being one which is true in all possible worlds that are accessible from the actual one.[1] I will argue that the courses of history introduced in § 7 are identical with possible worlds, and that the only possible worlds which are accessible are those which are available. These identifications of possible worlds with courses of history and accessibility with availability are the tricky part of the argument, and the part on which I will therefore concentrate. Thereafter the argument continues unproblematically as follows: those courses of history available at any point, or at any moment in a course of history, are indistinguishable at that point; whatever proposition about the present that is true in any one of the courses of history available at a point is therefore true in them all: if therefore a proposition about the present is possible (true in one accessible possible world) it is necessary (true in them all); but every proposition that is true is possible; so every truth about the present is necessarily true $\Pi pCpLp$.

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[1] See for instance Saul A. Kripke 'Semantical considerations on modal logic', reprinted in Leonard Linsky (ed.) *Reference and Modality* (Oxford 1971).

Let us consider then the identification of possible worlds with courses of history. A course of history was defined as 'a course which the history of the universe might have taken or might yet take, including thereby the course which it actually has taken'. If that or something similar will not serve to introduce the concept of a possible world, then that is a concept that I do not understand; nor, I think, does anyone. Naturally, once the concept of a possible world is introduced in such a fashion, then the way is open to performing such manoeuvres as the Quinean one of identifying possible worlds with certain complex set-theoretical arrangements of numbers.[1] But such an identification can hardly by itself explain the concept of a possible world. What for instance does it mean to say that a proposition is true in one of those set-theoretical arrangements? It means that it would be true were the history of the universe to take or to have taken a course in which the position of atoms at each moment of time is that given by the set-theoretical arrangement, interpreted as a set of spatio-temporal coordinates. But this explanation once more invokes the concept of a course of history. Courses of history are therefore possible worlds.

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[1] W. V. O. Quine 'Propositional objects', in *Ontological Relativity and Other Essays* (New York 1969).

What however of accessibility? My claim that possible worlds are identical with courses of history is inadequate to prove the necessity of the present, unless it can be shown also that the only accessible worlds are those which are available. What then can be done to show this? Whether one is a determinist or an indeterminist the number of possible worlds that one can see as accessible is identical with the number of them that one can see as available. Thus a determinist holds that, with regard to the future at any rate, all *available* worlds or courses of history are indistinguishable; for it is a consequence of D that

$$\Pi p\Pi nAFnpFnNp,$$

and this means that whatever happens with regard to the past, courses of history do not branch towards the future. A determinist also holds that, again as regards the future, all *accessible* worlds or courses of history are indistinguishable; for D^* says that there are no two distinct and incompatible possibilities for the future. An indeterminist by contrast in denying D^* holds that there are *accessible* at least two possible worlds or courses of history which are distinguishable from one another in the future; and an indeterminist is enabled to do this because he holds that

$$\Sigma p\Sigma nKNFnpNFnNp,$$

and that there are therefore *available* at least two possible worlds or courses of history which are distinguishable from one another in the future. Whatever one's views then the number of accessible worlds which differ in their futures is the same as the number of such worlds that are available. This cannot be dismissed as an inexplicable coincidence; for there is an explanation ready to hand in the identification of accessibility with availability.

Having made these identifications of possible worlds with courses of history and of accessibility with availability, the rest of the argument can continue without controversy. If *p* is true now, it is true in one of the courses of history available now; it is therefore (by the definition of availability) true in all of the courses of history available now; it is therefore true in all of the possible worlds accessible now; it is therefore necessary. Once more let me warn that the thesis just established, $\Pi pCpLp$, means only that a truth about the present cannot now be false. It does not mean that such a truth never could have been false now:

$$\Pi pCp\Pi nPnLFnp.$$

A truth about the present which never could have been false is one which is true now in every course of history that has ever been available, whether now available or not.

The necessity of the present can now be used, in conjunction with my claim that there is no deliberation about the necessary and impossible, to explain why there is no deliberation about the present. And because it can offer an economical explanation of this, further confirmation is bestowed upon my claim.

30. The results of the preceding section can now be used to explicate further the claim that there are no contingencies in the past. This claim then means that all courses of history available, or possible worlds accessible, not only are indistinguishable at present, but also have always been indistinguishable at every moment up to the present. They do not then branch backwards into the past. We can thus eliminate all views on the inter-relations between courses of history save the two depicted in Figures 1 and 2 of § 7. Each denies that courses of history branch backwards into the past; but the former denies that they branch forwards into the future, whereas the latter holds that they do. Figure 1 therefore depicts the deterministic view, Figure 2 the indeterministic one, in the only variants of those views that, given the necessity of the past, stand any chance of being correct.

31. The principle that the impossible is excluded from deliberation serves to some extent to justify those who decry having inconsistent desires as irrational. But only to some extent, for clearly it is quite rational to wish (i) that I be taken out to the Indian restaurant tonight, (ii) that I be taken out to the Chinese restaurant tonight, and (iii) that I not be taken out to both. However, although *wanting* inconsistencies is not always irrational, *willing* that they be true, or adopting inconsistent fiats, clearly is; and this is the grain of truth in the thought that it is irrational to have inconsistent desires. Now will is closely connected with deliberation; adopting a fiat seems to stand to practical as adopting a belief does to theoretical reasoning. And clearly inconsistencies are not possible. Thus by connecting modality with deliberation in the manner that I suggest, we can explain why willing the inconsistent is irrational, and can explain also the attraction, meretricious though it is, in the thought that in general desire of the inconsistent is irrational.

32. Aristotle (*Metaph.* 1015a26) gives as one kind of necessity and impossibility that which is due to force. If someone, for example, pushes you into a display of china, so that you have to fall into it and can do no other because you are forced to fall into it, then deliberating whether to fall or to do something else instead is quite out of place.

33. It is often, and rightly, said that 'ought' implies 'can', or that if one cannot do something it is not the case that one ought to do it. If there is the connexion that I suggest between deliberation and modality the implication is easily explained. The word 'ought', at any rate as used by modern moral philosophers, has become so attenuated that the first person 'I ought to ϕ' does little other than express the fiat 'Let me ϕ', and to adopt such a fiat is, we have said, in error if it is impossible for one to ϕ.

34. Many have thought that if others were to know what one will do before one has taken one's decision to do it, the process of reaching this decision, one's deliberation, is futile; at most one will vainly and inopportunely go through the motions of deliberation in the mistaken belief that they are called for. Moreover, all have thought it absurd to wonder what to do when one already knows what one will do. These views are easily explicable and justifiable on my account of the relations between deliberation and modality. There is an epistemic modality; there is a kind of possibility which something has if and only if it is not known to be false. It is this kind of possibility that one has in mind when one says of some large number that it may be prime, and also that it may be composite instead; for certainly one does not mean that here there is for instance a pair of distinct and incompatible *mathematical* possibilities. That there is an epistemic possibility is acknowledged by those determinists who say that the future seems contingent only because of our ignorance. Given then that there is a kind of possibility which something has if and only if it is not known to be false, and given also the equivalence *ELpNMNp*, it follows that there corresponds to this kind of possibility a kind of necessity which something has if and only if it is known to be true.

This epistemic modality is like the others we have discussed so far in permitting the inferences of *p* and *Mp* from *Lp* and *p* respectively. Unlike the others however that we have discussed so far, it cannot be spelt out in terms of truth in all or some accessible possible worlds.

Many will find dubious my claim that there is an epistemic modality. People sometimes criticise Plato, and indeed the Greeks in general, for having thought that in the principle 'If a thing is known it must be true' necessity attaches to the consequent as well as to the consequence. But if Plato thought this he was quite correct to do so, for it is true both that 'It is necessary that if it is known that *p* then *p*' and that 'If it is known that *p* it is necessary that *p*'. Plato's error would have been rather to suppose that what is epistemically necessary therefore has the same necessity as, for example, geometrical truth. A similar error is, I conjecture, made by those moderns who reject the thought that whatever is known is necessary. There has been recently, as we noted in § 21, a tendency to believe that necessity attaches only to the laws of logic. There has also been a widespread belief that the truths of logic are not the only truths that can be known. It is the combination of these two beliefs that I conjecture accounts for the refusal to accept that only the necessary is known. The latter of the two beliefs is one that I share. The former however is one that I do not; moreover, it is one that I refute many times over in these sections. My claim that only the necessary is knowable does not then place an unwarranted restriction on the objects of knowledge; rather, it requires one to remove an unwarranted restriction from what counts as necessary.

What is known is thereby necessary. It can furthermore be argued that what is known is therefore also necessary in some other way. For if a proposition that is known is about the present or the past, it is necessary also in virtue of being a truth about the present or the past. If a proposition that is known is about the future, then (as was argued above in § 14) it is necessary also in virtue of being entailed by facts about the present or the past in conjunction with laws. There remain propositions that are, in our strict senses, neither about the past, nor about the present, nor about the future; an example would be a conjunction, of whose conjuncts one is about the past and the other about the future. If one of these propositions is known to be true, then one may suppose that it too is like a known truth about the future in being entailed by a law in conjunction with a fact about the present or past, and in being necessary also for this reason. What is known is therefore doubly necessary: first, because it is know; and secondly, because it is entailed by truths which are necessary in virtue of being either laws or facts about the present or the past.

Having thus established that what is known is necessary we can now give more support to the claim that the impossible is excluded from deliberation. For we can use that claim in conjunction with what has thus been established to explain the plausibility of the view that if it is known that one will do something one would be mistaken in wondering whether to do it. If deliberation whether to do a thing must, as we have claimed, be conducted on the assumption that whether one does it or not is a contingent matter, then deliberation whether to do something when it is known that one will do it, or when it is known that one will not, is based on a misconception and is therefore quite pointless. By inference to the best explanation we can thus confirm our claim about the relations between deliberation and modality. Moreover, if our claim is correct, it is not only plausible to suppose that deliberation is futile when it is about what it is known one will do; it is also true.

35. Before we proceed, it will be worth drawing an incidental corollary from our arguments about epistemic necessity. In § 14 we saw that one application to the future of the belief in an omniscient God entailed determinism, and that a refutation of determinism would therefore be a refutation of that belief, or rather of that belief when applied thus. I have promised also that I will refute determinism by refuting its consequence D^*. Now the existence of the epistemic modality whereby what is known is necessary enables us to give a separate argument to show that D^* is entailed by a second application to the future of the belief in an omniscient God. The second application I have in mind is the thought that God knows the future in every detail:

$$\Pi p\Pi nADFnpDFnNp.$$

On eliminating the quantifiers from this we have

$$ADFnpDFnNp.$$

Assume the first of these disjuncts, $DFnp$. Since what is known is necessary, we have $LFnp$. Since Fnp entails $NFnNp$, it follows that $LNFnNp$, and thus that $NMFnNp$. And from this in turn together with $LFnp$ there follows $KLFnpNMFnNp$. And from this there follows

$$AKLFnpNMFnNpKLFnNpNMFnp.$$

This last result follows by an analogous process from $DFnNp$, the second disjunct of

$$ADFnpDFnNp.$$

It therefore follows from the version in question of divine omniscience. But on reintroducing quantifiers into the last result we have once more D^*.

It is not an accident that D^* is entailed by each of these applications to the future of the belief in divine omniscience. The reason is that both applications share the assumption that

$$\Pi p\Pi nAFnpFnNp.$$

If one does not accept this assumption the belief that God knows to be true every truth and knows to be false every falsehood about the future,

$$\Pi p\Pi nKEDFnpFnpEDNFnpNFnp,$$

will not commit one to D^*.

36. Although epistemic modalities could not be analysed in terms of truth in possible worlds, epistemic necessity did nevertheless imply actuality ($CLpp$) and epistemic possibility was nevertheless implied by actuality ($CpMp$). Deontic modalities are different. By a deontic modality I mean one for which it does not follow from 'You have got to, or you must, or you have to do that' that you will do that. Along with the failure of this inference goes the failure of the inference from 'You will do that' to 'You can or may do that'. Thus I do not mean by deontic modalities only those

which are in any heady way 'moral', as in 'One must not kill the innocent'. I include also such modalities as the one in 'You can't say that; it's inconsistent'. One could not respond to such a claim with 'Can't I? Just you wait while I say it again'. This modality too I therefore count as deontic.

Apart from this feature deontic modalities are just like all the rest. The equivalence 'You can do something if and only if it is false that you must not do it' holds for them too, no less than it does for all the others. 'Ought' implies the deontic 'can' no less than it implies the 'can's of logic or physiology. Furthermore, praise and blame are out of place when a man has done something he deontically had to do, just as they are out of place when he has done something he logically could not have helped doing: I do not thank, praise, or reward you for not having murdered me. Finally deontic modalities have the same connexion with deliberation as all the rest. The impossibility of *q* may obstruct the inference of 'Let it be that *q*' from 'Let it be that *p*' even where the inference is otherwise in order. *q* may have the consequences mentioned in *p*; it may lack the undesirable consequence of violating any other fiat 'Let it be that *r*'; but if *q* is impossible it is wrong to infer 'Let it be that *q*'. And since in some cases to infer 'Let it be that *q*' may just be to act or try to act in a certain way, acting or trying to act in that way would be equally wrong. An example will show that this holds also where the modality is a deontic one. Even though moving my bishop from the white square to the adjacent black one would threaten your queen, and even though it would not endanger any of my pieces, nevertheless it would be wrong; for one cannot move bishops like that. The 'cannot' here is purely deontic, for 'One cannot move bishops like that' is quite compatible with 'He surreptitiously did move his bishop like that'.

Another example will show how where the deontic modality is a 'moral' one it still has the same connexion with deliberation. Consider for example killing the innocent. My views

about this, and I hope the views of many others, are not fully expressed by the fiat 'Let me minimise killing of the innocent'. If that were all there was to my view, then on occasion my view might require me to kill an innocent person. For by killing one innocent person I might bring it about that fewer such killings took place than would otherwise have done. Yet my view is that even so it would still be wrong of me to kill the innocent person. Nor are my views about killing the innocent fully expressed by the fiat 'Let me minimise killing of the innocent *by me*'. For I am not indifferent about killing of the innocent by people other than me; indeed, it would be no less wrong of them than it would be of me to kill the innocent. It is not that I do not accept these fiats. It is rather that they do not contain all that I wish to say on the topic.[1]

A consequentialist might affect to find these views muddled. I am claiming, he might say, to find killings of the innocent by other people no less abhorrent than such a killing by myself; that is, I am claiming that who does the killing makes no difference to its moral status. But I am claiming also, he will add, that some special horror attaches to killings by me, or at least I must be claiming that if I refuse to kill an innocent person in order to prevent more such killings by other people. My concern about killing the innocent is then, he will conclude, simply muddled.

Perhaps it would be if it could be expressed only as a fiat. In fact however it is not, for moral concern can be expressed also by deontic modalities. Consider the statement of deontic impossibility

> 'No one can ever kill any innocent person.'

If this is true, then this alone is enough to make it incorrect for me to infer the fiat 'Let me kill this innocent person'. For

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[1] **Compare Robert Nozick *Anarchy, State and Utopia* (Oxford 1974) pp. 28 ff. What I speak of as fiats Nozick calls goals, and his 'side-constraints' are to be expressed by deontic modalities.**

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'I cannot kill this innocent person' follows from 'No one can ever kill any innocent person', and if I cannot do something I am mistaken in deciding to do it. This remains true however many of my fiats I would act on, and however few I would violate, if I were, *per impossibile*, to do that thing. In particular, I am mistaken in deciding to kill one innocent person even if that would prevent other innocent people from being killed. That is why I can coherently refuse to kill an innocent person whatever the consequences. But how can I coherently regard killings of the innocent by people other than myself as of the same status as killings by me? The answer is simple. If no one can ever kill any innocent person, anyone who at any time infers the fiat 'Let me kill this innocent person' is making just the same error as I would make if I were to infer that fiat now. We would be equally wrong and wrong for the same reason in either case. Deontic modalities therefore have the same connexion with deliberation as all the rest.

37. We have seen that two important kinds of necessity, the epistemic and the deontic, resist explanation in terms of truth in all possible worlds that are accessible from the actual one. We have seen also that nevertheless they share with all the other kinds of necessity a common relation to practical reasoning. This suggests that possible worlds semantics gives a less fundamental and general account of modality than that given by my account in terms of deliberation and the bearing of all the modalities upon it.

38. Our arguments on the relation between modality and deliberation suggest that there is a trichotomy into: first, necessities; secondly, contingencies that one cannot deliberate about; and thirdly, contingencies that one can deliberate about. To the first and last of these three categories there correspond the two kinds of reason. Theoretical reason deals with the former, regulating one's beliefs and one's decisions that so-and-so is the case: practical reason deals with the latter, regulating one's actions and one's decisions to do so-and-so. If I am right in supposing that one can have theoretical knowledge that p only if p is in some way necessary, and right also in supposing that one can have no practical knowledge of things about which one cannot deliberate, it should come as no surprise that we cannot find any branch of knowledge corresponding to the second category, contingencies that one cannot deliberate about.

39. This suggested account of theoretical and practical reason offers the best prospect of defending the conventional wisdom among moral philosophers that there is a huge contrast between 'is' and 'ought' or between 'fact' and 'value'. The conventional wisdom is that 'factual' questions are about truth and falsehood, or about what is objectively out there in the world, whereas 'evaluative' questions are neither of these things.

Now on the suggested account, when the practical question 'Shall I visit Paris next summer?' arises, it is as yet indeterminate whether I will visit Paris then. It is not a fact that I will visit Paris next summer, nor is it yet a fact that I will not. If I answer the question by deciding to visit Paris, this answer cannot be correct in virtue of fitting the pre-existent fact that I will visit Paris, nor incorrect in virtue of failing to fit the pre-existent fact that I will not visit Paris. For there was not beforehand any such fact for my decision to fit or fail to fit. Contrast however the theoretical question 'Did I visit Paris last summer?'. Here either it is a fact that I did, or it is a fact that I did not; and my answer to the theoretical question must fit whichever of these is the fact of the matter. There is a sense then in which practical reasoning, unlike its theoretical counterpart, operates unconstrained by facts.

Another facet of the conventional wisdom is that reason fails to yield a determinate answer to 'evaluative' questions, and that in answering them we are therefore left with an arbitrary choice, unconditioned by rational considerations.

There is some slight truth buried here: sometimes two distinct and incompatible answers to a practical question would each be equally correct, whereas the facts impose not just an answer to a theoretical question, but a unique answer. It may thus be for instance that a decision to visit Paris would answer the practical question of where to spend one's holiday at least as well as any other decision, but would not answer that question any better than a decision to visit Athens. By this I do not mean that *so far as one knows* or can be expected to know, the reasons in favour of visiting Paris are at least as strong as the reasons in favour of any other course of action but are no stronger than those in favour of visiting Athens instead. What I have in mind is not what happens when one is offered a choice between two boxes, of which only one contains money, and where one cannot tell, before making one's choice, which is the one with the money in it. In such a case there is no reason, so far as one knows or can be expected to know, for picking one box rather than the other; nevertheless to pick the empty box would still be an error. It is an error because it is not the best choice one could have made; and it remains an error even though it is one that it is not irrational to make and one that is therefore quite pardonable. What I have in mind rather is what happens in a case where one is offered a choice between two boxes, each of which contains exactly the same amount of money as the other. Here the decision to pick the one and the decision to pick the other would each be equally correct, even though they are incompatible. This does not apply to theoretical questions. Conflicting answers to them may be equally good in the sense that they are equally well evidenced, but not in the sense that they are equally right. When Buridan's ass between the two bales of straw asked the practical question 'Which straw if any shall I go and eat, that on my left or that on my right?', two of the incompatible ways of answering it would each have been equally correct; whether he had gone to the left or had gone to the right instead he would still have answered his question correctly. When however we ask the theoretical question 'Which straw if any did the ass go and eat, that on his left or that on his right?', only one correct answer is possible.

The account of theoretical and practical reason suggested by my thesis about deliberation and modality affords some explanation of this difference between them. Since practical reason deals with contingencies, when a practical question arises there is more than one course of action open; if the ass can do no other than stay still, his deliberation whether to do that or not is in error. Since theoretical reason deals with the necessary, when a theoretical question arises there is no such range of possibilities open; if the ass stood still, there is now at most a merely epistemic possibility of his having moved. My account then leaves no room for different and incompatible right answers to theoretical questions; here the facts of the case forbid all answers save one. When however a practical question arises, the facts do not impose a uniquely correct answer; rather, they leave several alternatives open. Only because this does happen for every practical question can it happen for some practical questions that two of these alternatives are each equally correct answers; for if all but one of the apparent alternatives were in fact impossible, a decision to do any of them would be incorrect.

Now from what we have said above (§ 23) about the nature of practical inference, it should be clear how either of two incompatible conclusions can each be validly inferred from the same set of practical premises: each of the two incompatible conclusions can be equally within one's power, can equally conduce to the realisation of some of one's aims, and can equally fail to frustrate any of the others. The possibility of inferring each of two incompatible conclusions from a set of practical premises need not then be due to any defect or inconsistency in that set of premises. For that one may infer either of the two conclusions does not mean that one may infer both; and indeed one may not infer both, since their conjunction is inconsistent, and thus impossible. From a perfectly correct set of premises one can then in reasoning practically infer either of two incompatible conclusions. Given that the original set of premises was correct, and given also that valid practical inference, like its deductive counterpart, transmits correctness from its premises to its conclusions, it follows that two incompatible answers to a practical question may each be equally correct. In such a case deciding on one of the alternatives rather than the other can only be arbitrary. Thus my account of theoretical and practical reason lends some support to another facet of the conventional wisdom about fact and value.

40. This is not to say that the account outlined of theoretical and practical reason will justify all that is conventionally said about the difference between 'factual' and 'evaluative' questions. Not everything that would be counted an 'evaluative' question is a practical one; or, to put it another way, 'evaluative' propositions are not always, as the jargon has it, 'action-guiding'. One does not deliberate in order to answer 'Was Richard III unjustly maligned by Tudor propagandists?'; one does history. And many 'evaluative' propositions are such that when they come true it is far too late for them to guide action: 'Although they were committed in a setting far removed from our own in both time and space, the crimes of Phalaris were nevertheless the actions of a thoroughly wicked man.' The consequences that my account has for the answers to practical questions it does not then have for the answers to 'evaluative' questions generally.

Moreover, my account does little to justify the conventional wisdom in its belief that theoretical reason is somehow intellectually superior to its practical counterpart, and indeed that practical reason is no kind of reason at all. The absence of facts for practical judgments to fit does not mean that they can neither be right nor wrong; the view that practical judgments, if correct, are correct in a very different way from

theoretical judgments does not imply that they are never correct at all. Furthermore, although we should accept that there is nothing to choose between some pairs of answers to some practical questions and that one must therefore settle arbitrarily on one of the pair, we are not thereby committed to accepting that this is true of every pair of answers to every practical question. The ass who eats the straw on his left answers his practical question no more and no less correctly than the ass who eats the straw on his right; nevertheless, each answers his practical question more correctly than the ass who stays in the middle and starves. Finally, the fact that some correct answers to some practical questions have incompatible answers that are equally correct does not mean that such a question has no correct answer; it means simply that there are several correct answers to such a question.

My account of the differences between theoretical and practical reason does not then promote the former and demote the latter; it allows that one can know to do something as well as know that something is the case. And this is as it should be, for almost all the other concepts for intellectual states and performances can be applied to practical no less than to theoretical reasoning: one can for example wonder, ask, be informed, find out, whether to do something, just as one can wonder, ask, be informed, find out, whether something is the case. The main exception seems to be belief: one can believe that something is the case, but one cannot believe to do something. The explanation is ready to hand in our distinction between practical and theoretical reasoning; for the former, as we said in § 38, regulates our actions, whereas our beliefs are the province of the latter alone. But this failure of the analogy between the two hardly means that practical reasoning is intellectually more disreputable than its theoretical counterpart. On the contrary, it renders absurd a sceptical claim that practical judgments are the objects never of knowledge, but only of belief.

Although the nugget of truth that it finds is not large, nevertheless the fact that the suggested distinction between theoretical and practical reason does find and explain a nugget of truth in the conventional distinctions between 'is' and 'ought' or 'fact' and 'value' should commend it to all those who are tempted to follow that convention. It should commend also the account of the relations between deliberation and modality which suggested that distinction between theoretical and practical reason.

41. Our thesis that the impossible is excluded from deliberation has now been established with sufficient firmness to enable us to put it to work. In this Section I will use it to refute the belief that determinism is compatible with freedom of the will, and that one may therefore accept them both. I will do this by showing how determinism entails fatalism. Fatalism is perhaps more a bundle of attitudes than a doctrine susceptible of precise formulation. What will be will be, and there is no point in our struggling against it; things take their course regardless of our wills; we can but drift with the tide of what is bound to happen. Each of these in its own way expresses a fatalistic attitude. What seems to be behind them all is the thought that it is pointless ever to deliberate and take decisions to do or not to do anything, the thought that it is always an error to reason practically. It is this thought that I call fatalism, and it is this thought that I declare to be entailed by determinism. The proof is simple. Determinism entails D*, the view that every detail of the future is fixed and necessary. This in turn entails that no detail of the future is within the scope of deliberation. Determinism therefore entails fatalism. Now whatever people may have thought about the compatibility of free will with determinism, no one to my knowledge has ever supposed that free will is compatible with fatalism; and wisely so, for the pair are quite obviously incompatible. Since determinism entails fatalism, it too is therefore incompatible with freedom of the will.

42. The brand of indeterminism that I have been propounding not only can explain the attractions of fatalism; it also, curious though this may sound, itself possesses some of those very attractions. I have argued for the necessity of the present (§ 29); I have argued also for D5 as a criterion for which parts of the future are determined (§ 11). These positions commit me to the further one that if p will be the case at some time, then of necessity p will be the case at that time; that is, they commit me to

$$\Pi p \Pi n CFnpLFnp$$

and not just to

$$L\Pi p \Pi n CFnpFnp.$$

The reasoning behind this is simple. If a proposition of the form Fnp is true, then according to D5 it is entailed by the conjunction of a law with a truth about the present. But since both laws and truths about the present are necessary, what they entail is also necessary. And so every truth of the form Fnp is a necessary truth. One tenet of my indeterminism may therefore be expressed thus: every fact that there is whether about the past, the present, or the future, is there of necessity. Acknowledgment of this truth can well lead one into determinism, for it is all too easy to overlook the other tenet of my indeterminism, that there are, as it were, interstices between the necessary facts in just those cases where $KNFnpNFnNp$. Moreover, once one adds to my view that

$$\Pi p \Pi n CFnpLFnp$$

my other view that there can be deliberation only about the contingent, one obtains the thought that inasmuch as there are any facts about the future they too are like facts about the past in not being within the scope of deliberation; one obtains the fatalistic thought that if something will happen, there is no point in wondering how to prevent it.

This is the thought at the back of the familiar arguments for fatalism of the form:

If I will die in the air raid there is no point in my going into the shelter.

If I will not die in the air raid there is no point in my going into the shelter.

But either I will or will not die in the air raid.

Therefore there is no point in my going into the shelter.

The defects and merits of this kind of argument can be more easily assessed if we move into symbolism. Once we do this we can see that such arguments suffer from several severe ambiguities. Let p abbreviate 'I am dead as a result of the air raid'; let q abbreviate 'There is no point in my going into the shelter'; and let n units of time be a period after which the air raid will have ended. There are now two ways of formalising this argument which make it valid:

(A) $CFnpq$
$CFnNpq$
$AFnpFnNp$
Therefore q

(B) $CFnpq$
$CNFnpq$
$AFnpNFnp$
Therefore q

The first premise of both is correct; for if something will happen, then it must happen, and it is mistaken to try preventing or producing the necessary. For the same reason the second premise of (A) is also true. The third premise of (A) is however false, or at any rate it is not granted by an indeterminist such as myself who claims that

$$\Sigma p \Sigma n KNFnpNFnNp.$$

By contrast I will grant the third premise of (B), for that is but an application of the law of the excluded middle. The second premise of (B) need not however be granted by an indeterminist. For he will hold that in some cases neither Fnp nor its contrary $FnNp$ is true, and that in these cases q need not be true either; in other words he will hold that in some cases the future is indeterminate, and that in these

cases it may be worth while deliberating and taking steps to make the future turn out one way rather than the other. Each of the two valid formalisations of our fatalistic argument therefore suffers from one and only one false premise. There is furthermore one way of formalising our fatalistic argument so that all its premises are true. This is:

(C) $CFnpq$
$CFnNpq$
$AFnpNFnp$
Therefore q.

(C) shares its true first premise with both (A) and (B). It borrows its true second premise from (A), and borrows its true third premise from (B). But the price that (C) has to pay for having no false premises is that it is invalid: the two propositions that its first two premises say imply q are not the two whose disjunction is asserted in the third premise; or at any rate an indeterminist will not admit that $FnNp$ is the same as $NFnp$. The three formalisations (A), (B) and (C) explain the attractions of our fatalistic argument. Since the distinctions between them are so subtle, and not at all apparent until one moves into formal symbolism, it is only too easy to coalesce the three and take oneself to have found a single argument which is both like (A) and (B) in being valid, and also like (C) in having all its premises true.

43. In § 41 we refuted the view that determinism is compatible with belief in free will. This left us with the three alternatives: first, that determinism is true; secondly, that some human actions are free; and thirdly, that human actions are neither free nor determined. In this section I will refute determinism, and thus eliminate the first of the three remaining alternatives.

Suppose that someone believes determinism and is wondering whether, for example, to assert it. Now if he gives any regard at all to the truth or otherwise of what he may say, he is exercising, or at least has exercised, his theoretical reason.

More to the point however is the fact that he is also exercising his practical reason. Although one sometimes contrasts words with deeds, assertion is nevertheless an action and to wonder whether to assert something is therefore to deliberate. Now since he is deliberating whether to assert determinism he assumes it to be a contingent matter whether he asserts determinism or not. But this assumption is incompatible with determinism. How then can he repair this inconsistency in his views? Imagine that he stops wondering whether to assert determinism. This does not guarantee consistency unless he no longer deliberates about any topic. The example of wondering whether to assert determinism has a certain dramatic force; for there is something especially incongruous in wondering whether to assert a thing that is incompatible with the very assumptions that one makes in so wondering. Nevertheless, the example is not essential to my argument; *any* piece of deliberative reasoning would do just as well to convict our determinist of inconsistency. Can he eschew deliberation altogether? Suicide would be too drastic. Although it would stop him deliberating, it would also stop him believing in determinism. On the other hand, nothing less than suicide would be drastic enough. Drugs or drink might induce a temporary suspension of his practical reason, but as soon as their effects wear off the inconsistency will reappear. This inconsistency therefore requires him to abandon his belief in determinism.

44. It is as well to be clear about the exact range and structure of the preceding argument. It neither requires nor shows that whenever one takes something to be within the scope of deliberation and so to be undetermined one is correct to do so. If it did, it would be absurd. It would be silly to say, for example, that no one ever mistook the time and so wondered at five past five whether to go for tea at five. Rather, my argument requires only that one cannot rid oneself of all one's beliefs to the effect that something of one's future actions is as yet undetermined; for so long as even one such belief is maintained one cannot consistently believe in determinism. This argument against determinism is addressed to all rational agents. The only way they are able to escape it is by ceasing to be rational agents; for the argument does not prove to one who does not deliberate that his future actions are indeterminate. This is entirely as it should be. One would rightly look askance at any argument purporting to prove to a corpse that there is an indeterminacy in its future. My argument addressed to all rational agents is formally an argument *ad hominem*. It does not show determinism to be internally inconsistent; rather, it shows determinism to be inconsistent with other beliefs that the determinist has. In two ways however it is more forceful than *ad hominem* arguments usually are. First, one can be sure that every determinist, and not just one's opponent of the moment, has some, indeed many, beliefs that are inconsistent with his determinism. Secondly, unlike many *ad hominem* arguments this one does not leave open to the determinist the choice of which of his beliefs to abandon in order to attain consistency among them. Determinism is therefore shown to be the source of the inconsistency, even if it is not shown to be inconsistent in itself.

45. The indeterminism we have just proved does not however suffice for freedom of the will. If it did, freedom of the will would be displayed in all the random happenings of subatomic physics. We can however move from indeterminism to freedom of the will by appealing once more to assumptions that one makes in deliberation. In doing so we will eliminate the final alternative to belief in freedom of the will, the belief that human actions are neither determined nor free.

When deliberating one assumes more than that there are several alternatives each of which may be realised. One assumes also that which of the various alternatives comes to pass will depend on the outcome of one's deliberations; and it is perhaps because of this latter assumption, as we saw in

§ 25, that one is committed to the former. We have spoken of matters that although contingent are nevertheless not fit subjects for deliberation: the random behaviour of sub-atomic particles provides one example; the behaviour of other people, as I will show in § 66 below, provides another. These are just those matters where no decision one takes will have any effect, where which of the alternatives comes to pass does not depend on the outcome of one's deliberations. If the first assumption may be summarised as the assumption that before one's deliberation one's future actions lack causes, the second may be summarised as the assumption that one's deliberations have effects. And the denial of either assumption leads to the fatalistic conclusion that deliberation is erroneous. The combined force of these two assumptions is that whichever of the alternatives will have been realised will have been determined by one's deliberations, and that it will not have been determined by anything prior to them. One is then committed to the belief that there will be future events, one's own future actions, whose origins will lead back to one's own deliberations but no further, the belief that one's deliberations are both autonomous and efficacious. It is this belief that I take to be the belief in one's own free will. And one can no more shun commitment to it than one can shun commitment to indeterminism; for my arguments in favour of each are of identical structure and force.

46. Aristotle speaks of 'the voluntary' as having 'the origin of the movement of the limbs' within the agent.[1] The previous section has shown the truth in this. Free action is not (*pace* the determinists) that which is preceded by a chain of causes stretching back into eternity, the final links of which are the deliberations of the agent. Rather, where the agent acts freely, then not only the proximate but also the ultimate cause lies within him.

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[1] *EN* 1110a15–16. Compare for example two other passages in the immediate context: 1110b4 and 1110b15–16.

47. Our argument showing each person that his own future actions are not determined and that he has a free will has discharged only some of the undertakings made in § 1. However what it has discharged is still substantial enough to make it worth our while to pause and examine first, some consequences of the indeterminism we have established, and secondly, the defects in the various arguments for determinism. The former task will occupy us until § 61; the latter we will take up thereafter.

48. The defect of determinism that our refutation of it relied upon was its assimilation of the future to the past, its claim that just as there are no contingencies in the past, so too there are none in the future. What ways of assimilating the two are left open? Just how different does our proof of indeterminism require them to be?

In three important respects the future is wholly symmetrical with the past. In the first place both the future and the past tense operators are to be explained in an exactly parallel way. To employ once more the diagrammatic terms of our earlier account (§ 7).

> A proposition *Fnp* is true at a point on a line if and only if *p* is true *n* units above that point on every line which passes through that point; and a proposition *Pnp* is true at a point on a line if and only if *p* is true *n* units below that point on every line which passes through that point.

In the second place, any fact that there is about the future of the form *Fnp* is just as necessary and just as far removed from the scope of deliberation as any fact about the past of the form *Pnp* (§ 42). In the third place, both propositions about the past and those about the future are equally subject to the principle of bivalence and to the law of the excluded middle. If ever *APnpNPnp* is true, then so is the corresponding proposition about the future *AFnpNFnp*. I choose this cautious formulation in order to avoid such questions as whether the law of the excluded middle fails for vague propositions. If it fails for vague propositions, it will fail for vague propositions about the future. This is not at issue here, for the only point that I wish to make is that there is nothing about the future as such which leads to a failure of the law of the excluded middle. In pointing to these profound and important symmetries between the future and the past, we can offer some explanation of why people should have tried to assimilate them even further.

49. Accepting that the Law of the Excluded Middle applies to propositions about the future makes us, in one sense, *realists* about the future. In this sense an attitude of realism towards something is identical with acceptance of the Law of the Excluded Middle with regard to propositions which take that thing as their subject matter. The mathematical realism which the intuitionists have challenged is of this kind; it consists in holding that the Law of the Excluded Middle applies without qualification to the propositions of mathematics. In this sense then the future is just as real as the past.

50. This kind of realism with regard to the future should not be confused with the belief that

$$\Pi p\Pi nAFnpFnNp.$$

That is a belief that I do not share, for in conjunction with D5 and the principle that laws and truths about the present are necessary it leads straight to D^*. That belief has nevertheless often been confused with the Law of the Excluded Middle. For instance such plausibility as attaches to the logical argument for determinism (§ 13) and to the fatalistic arguments instanced in § 42 seems due to just this confusion. Furthermore, indeterminists who have denied the bivalence of propositions about the future seem to have been driven to this extremity by the same confusion between

$$\Pi p\Pi nAFnpFnNp$$

and the correct application of the Law of the Excluded Middle to propositions about the future

$$\Pi p\Pi nAFnpNFnp.$$

That this confusion is a confusion should be patent now that I have formalised it. The Law of the Excluded Middle does not hold true the disjunction of any proposition with any negation of it however formed, whether external or internal; it holds true rather the disjunction of any proposition with its external negation or contradictory. It is no objection to the Law of the Excluded Middle that 'Either everyone does smoke or everyone does not smoke' is false. Similarly, the Law of the Excluded Middle does not require that

$$\Pi p\Pi nAFnpFnNp.$$

Just how similarly will be patent if one recollects the account we gave of the future tense Fnp. Such a proposition, we said, is true at a point on a line if and only if p is true n units above that point along *every* line which passes through it.

There is of course some excuse for making this confusion about the Law of the Excluded Middle as it applies to the future. With regard to the past it is true not only that

$$\Pi p\Pi nAPnpNPnp,$$

but also that

$$\Pi p\Pi nAPnpPnNp.$$

The former is the Law of the Excluded Middle; the latter is of course true for the reason that there are no contingencies in the past, no two incompatible possibilities as to the way things have been. No examination of the past tense then will bring to light the difference between the internal and the external negations of a tensed proposition, for as far as concerns the past tense those two negations are equivalent:

$$\Pi p \Pi n EPnNpNPnp.$$

Furthermore, the explanation to be given of the future tense was, we noted, exactly symmetrical with the explanation to be given of the past. There is therefore some excuse for thinking that with regard to propositions about the future too there is no distinction to be drawn between their internal and their external negations, and thus for mistaking the way in which the Law of the Excluded Middle applies to them. And in finding this excuse for this mistake we can claim to have explained why people are so prone to make it.

51. Although

$$\Pi p \Pi n AFnpFnNp$$

is not an application of the Law of the Excluded Middle, there is nevertheless a sense in which one who denies it denies the reality of the future. For a proposition of the form

$$KNFnpNFnNp$$

might be read, in a romantic way, thus: there are no facts yet about how p will be then, whether true or false; here there is a gap in the future. It is this sparseness of facts about the future which accounts, I think, for the sparseness of our knowledge about it; we don't know much about the future because there isn't all that much to know. In this respect the future is less real than the past, for the past suffers from no such gaps. The Old World, one might say, is completely built over with facts, but in the New World there remain some wide open spaces.

52. But how wide? Earlier (§ 11) we mentioned the ultra-radical and the radical indeterminist. An ultra-radical indeterminist held that

$$\Pi p \Pi n KNFnpNFnNp,$$

which may be understood to say that the future contains nothing but wide open spaces; a radical indeterminist agreed, making the one proviso that where Np was inconsistent Fnp was true. A refutation of ultra-radical indeterminism was suggested the moment that it was introduced: any reasonable tense logic will contain a rule holding that if p is a theorem so too is Fnp; in consequence, if there are any theorems at all, there are truths about the future of the kind denied by the ultra-radical indeterminist. A merely radical indeterminist is of course not vulnerable to this argument. He is however vulnerable to an adaptation and extension of our proof of free will (§ 45). If the only propositions of the form Fnp which can ever be true are those which assert the future truth of something that it would be inconsistent ever to deny, then nobody can ever make true any proposition of the form Fnp. For the propositions of that form which are true are true regardless of what anyone does or fails to do about them; and if no others of that form can ever *be* true, they can hardly be *made* true. Radical indeterminism implies then that nobody can ever bring it about that Fnp. That is, I suspect, inconsistent with an assumption made in deliberation; for I suspect that the assumption of the efficacy of one's deliberations is the assumption that they do sometimes bring it about that Fnp. In that case no rational agent can consistently be a radical indeterminist. Although there are not many facts about the future, there are then nevertheless some.

53. My suspicions may not be correct. One might argue that what one's decisions bring about is not so much a truth about the future as a tendency in the present. What *will* happen is not the same as what *is going to* happen. This may not be immediately apparent when put in that way. However the difference is obvious when we consider past-tensed versions of 'It will be in n units that p' and 'It is going to be the case in n units that p'. 'Yesterday I was going to finish that book this morning' is quite compatible with 'But as things

turned out, circumstances prevented me from even looking at it'; but 'Yesterday it was true that I would finish it this morning' is not. If the requirements of free will are then satisfied merely by one's being able to engender a present tendency, my argument against radical indeterminism fails.

But why should anyone want to defend radical indeterminism? One might think that one can find some support for it in some theological propositions. Thus belief in an almighty God might lead one to suppose that if a proposition is consistent, then for every moment in the future there is some course of history available from now such that that proposition is true at that moment in that course of history, and true because God has intervened to make it true. From this supposition radical indeterminism would immediately follow. But this supposition hardly seems a necessary consequence of belief in divine omnipotence. There seems to be no reason why an almighty God should avoid exercising his powers until, as it were, the last minute, or should refrain from taking any decision about some moment in the future, even the decision not to intervene, until that moment is upon him. Nothing in the omnipotence of God prevents him from already, indeed long ago, having made up his mind as to how some aspects of the future will be. Furthermore, if God ever has made up his mind about how some part of the future is to be, his very omnipotence means that his decision about the future is sure to be carried out. There are then facts of the form Fnp where Np is consistent, or at any rate divine omnipotence does not require that there are none. Although in this respect the future is less real than the past, it is nevertheless not wholly unreal.

54. Hitherto I have impugned the reality of the future by saying that there are spaces left between the facts about the future in just those cases where $KNFnpNFnNp$. I have not yet impugned the reality of those future facts themselves. So far I have said only that there are not *enough* facts about the future for it to be as real, in a way, as the present or the past are. Let me now then turn from the *number* of facts about the future to their *character*.

Earlier (§ § 9–11) it was argued that a proposition about the future Fnp is true if and only if there is something in the present or the past to make it true. This claim, I argued further, could be simplified to the claim that the only way a proposition Fnp can be true is by something in the present making it true. This I formalised as

$$\text{D5} \quad \Pi p \Pi n E F n p \Sigma q \Sigma l K p K \not{L} l \not{L} C K l q F n p.$$

A consequence of D5, or another reading of it, seems to be that no future fact exists in its own right, and that such facts as there are of the form Fnp are merely shadows cast by facts in the present. But does accepting D5 genuinely mean that one is denying the reality of the future? If it does, then determinists deny the reality of the future no less than I do. For D5, as we noted in § 11, was a consequence of D2. Indeed, if in accepting D5 one denies the reality of the future, determinists deny also the reality of the present and the past. For theses analogous to D5 about the present and the past are:

$$\text{D7} \quad \Pi p E p \Sigma p \Sigma n \Sigma l K P n q K \not{L} l \not{L} C K l P n q p$$

and

$$\text{D8} \quad \Pi p \Pi n E P n p \Sigma q \Sigma m \Sigma l K P m + n q K \not{L} l \not{L} C K l P m + n q P n p.$$

Each may readily be constructed from D2. If D5 says that any fact about the future is merely a shadow cast by facts in the present, D7 says that every present fact is but a shadow cast by some fact in the past, and D8 that every fact in the past is but a shadow cast by some fact further back in the past. If in accepting D5 I deny the reality of the future, determinists deny the reality of everything: for a determinist, no fact at all, whether past, present, or future, can as it were exist in its own right without the support of prior facts.

55. Indeed, I am inclined to believe that accepting D5 itself does mean denying, in a sense, the reality of the future; and inclined therefore to charge determinists with denying in that sense the reality of the present and the past as well. More importantly however, the combination of D5 with some other tenets of my indeterminism does have the clear consequence that the future is, in a sense, less real than the present, because there are facts about the present that do not owe their being to facts about the past in the way that every fact about the future owes its being to facts about the present. More formally:

$$\Sigma pKpN\Sigma q\Sigma n\Sigma lKPnqKŁlŁCKlPnqp,$$

which says that there are facts about the present which are not entailed by any facts about the past in conjunction with any laws. The proof of this can easily be devised from what has already been established. If one is a free agent, then until the moment that one's decision to act is taken there remained open two possibilities for one's future, the one of deciding in that way, the other of deciding otherwise. That is, where p is a proposition asserting the occurrence of some free choice,

$$\Pi nPnKNFnpNFnNp.$$

If p then is a truth about the present asserting the occurrence of some freely taken decision, then there remained open right up to the present not only the possibility of its now being true but also the possibility of p's now being false: put more formally, this is

$$\Pi nPnNFnp.$$

From this it follows that at no moment in the past was there a truth about that moment which in conjunction with a law entailed that p would be true now; more formally, it follows that

$$N\Sigma q\Sigma n\Sigma lKPnqKŁlŁCKlqFnp.$$

For had there been such a truth and such a law, Fnp would then have been true, and not the falsehood that the previous step tells us it was. By the equivalence

$$EŁCKlqFnpŁCKlPnqp,$$

this gives us

$$N\Sigma q\Sigma n\Sigma lKPnqKŁlŁCKlPnqp,$$

which in conjunction with p yields the result which was to be proved. My indeterminism requires then that the present is, in a sense, more real than the future: facts about the future owe their being to facts about a preceding time, namely the present; but facts about the present do not always owe their being to facts about a preceding time, namely the past. We should note that the reality of the present in this respect is heavily dependent upon the unreality of the future in another; for in our proof of the reality of the present we were obliged to invoke a premise expressing in a way the unreality of the future when we claimed that at all stages of the past there had been a truth of the form $KNFnpNFnNp$.

What about the reality of the past? On the assumption that there has been a free agent in the past, an argument like that in previous paragraph can be devised for the thesis:

$$\Sigma p\Sigma nKPnpN\Sigma q\Sigma m\Sigma lKPm + nqKŁlŁCKlPm + nqPnp.$$

This says that there are facts about the past which do not owe their being to facts about any stage further back in the past. The assumption required to show this, namely that there has been a free agent at some time in the past, has not so far been proved. But nobody, I trust, who has followed our argument so far and thus accepts that he is a free agent will claim that he has only just this instant come into being as a free agent. Granted then this assumption, we can prove this thesis, and so show that the past is in some important way more real than the future and no less real than the present.

56. But can the present be seen as no more real than the past? Both present and past are, as we have shown, ontologically superior to the future. This result however leaves open the possibility that the past is nevertheless ontologically inferior to the present. It is my belief that this possibility is realised and that there is one way in which the present has the ontological edge over the past. It was argued above (§ 10) that if a proposition *Fnp* is made true by a fact about the past, then it is also made true by a fact about the present. This was formalised as:

$$\text{D6}\quad \Pi p \Pi n C \Sigma q \Sigma m \Sigma l K P m q K \not{L} l \not{L} C K l P m q F n p$$
$$\Sigma r \Sigma k K r \not{L} k \not{L} C K k r F n p.$$

Now it can, I think be argued that the converse does not hold, and that there are propositions about the future *Fnp* which are made true by facts about the present, but which are not also made true by facts about the past. The denial of the converse of D6 may be formalised thus:

$$N \Pi p \Pi n C \Sigma r \Sigma k K r K \not{L} k \not{L} C K k r F n p \Sigma q \Sigma m \Sigma l K P m q K \not{L} l$$
$$\not{L} C K l P m q F n p.$$

This can be proved on the assumption that there is some truth about the present, asserting the occurrence of some freely taken decision, and that this truth in conjunction with a law entails a proposition of the form *Fnp*, for which it is false that $\Sigma m P m F m + n p$. This assumption is granted by anyone who supposes that his present decisions bring about the truth of a proposition *Fnp* of which it was false to say beforehand that it would be true now, as does anyone who supposes that his present decisions make a difference to the future. The past therefore can affect the future only through affecting the present; the present however affects the future directly.

57. Giving the ontological edge in this way to the present over the past does not, it should be noted, lead us to a 'solipsism of the present', to the belief that only the present is fully real.[1] That name is better applied to the doctrine which combines my denials of reality of the future, D5 and

$$\Sigma p \Sigma n K N F n p N F n N p,$$

with the theses which result when the future tense operator *F* is replaced in them uniformly by the past tense operator *P*. The former of the two resulting theses says in effect that just as any fact about the future exists only as a shadow cast by facts in the present, so too any fact about the past exists only as a trace that it has left on the present. The latter of the two resulting theses is tantamount to assuming that courses of history branch backwards into the past as well as forwards into the future. It holds that there are gaps in the facts about the past, just as there are gaps in the facts about the future.

The latter of the two theses has already been refuted, for it is nothing other than the thesis that there are two distinct and incompatible possibilities with regard to the past, both of which are open. As yet however we have said nothing about the past tense analogue of D5. I can see nothing to be said in its favour; at any rate, since there is no indeterminacy about the past, no argument can be constructed parallel to that given for D5 in § 11 above. I cannot however construct any argument against it, save by setting out an example that shows it has a certain lack of plausibility. Shuffle a pack of cards a thousand times, burn them, rake the ashes to a dust, scatter the dust to the winds; is it plausible that there will remain any trace of the order the cards were in after their five-hundredth shuffle?

58. The distinctions we have been noting between past, present and future show that there is also an important distinction between the single dimension of time and any of

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[1] I owe to Professor Anscombe the phrase 'solipsism of the present'; she accused me of it once.

the three spatial dimensions. Nothing in space corresponds to these features of time. There is no plane which answers to the present, with all the space on one side of it answering to the future, and all on the other answering to the past. For there is no tract of space less real than any other in the ways in which we have seen the future to be less real than the past; nor is there any plane through space which has the limited ontological supremacy that we attributed to the present. Indeed, there appears to be no part of space in any way at all more real than any other. The reason for this appearance is not that we happen to lack the linguistic resources for formulating the unreality of, say, the South; expressions like 'A hundred miles to the South' and 'The weather is warm' would do perfectly well for this task. The reason is rather than once formulated any version of the superior reality of the North would be immediately absurd. Time then is anisotropic in a way that space is not.

59. This crucial lack of analogy between time and space should render suspect a fashionable assimilation of the two: the belief that any apparently three-dimensional object is really a four-dimensional object spread in space-time. Thus a man, say, is in spite of all appearances really a four-dimensional object; his infancy is a part of him in exactly the same way as his head, each being but a four-dimensional extremity of the four-dimensional whole. Indeed, this lack of analogy renders the assimilation not just suspect, but false. For on this assimilation we are taught to regard a proposition like 'Smith will be sitting in five minutes' as predicating 'is sitting' of a cross-section through the four-dimensional Smith perpendicular to the time-axis, a cross-section named by 'Smith in five minutes'. Anyone however who deliberates whether to ϕ or not in n minutes time grants the truth of the proposition

$$KNFn\phi aNFnN\phi a,$$

where 'a' is a proper name of his. If a were really a four-dimensional object, this would have to be read as predicating of something named by 'a in n minutes' the incompatible properties of $N\phi$ and $NN\phi$. This assimilation, and its corresponding analysis of tensed propositions, therefore treats some truths as self-contradictory.

60. A similar argument will refute a fashionable view about the nature of truth. The symbolism that we have been using so far has tacitly assumed that the bearers of truth-values can, with the passage of time, come to bear truth-values different from those that they once bore. This runs against the fashionable beliefs that truth is timeless, that the things which are true are eternally true, and that tense is merely a feature of the sentences in which we ordinarily express truths, and not also a feature of those truths themselves. These beliefs take on various guises. Some philosophers talk of the real bearers of truth-values as 'propositions' meaning by that abstract entities which get 'expressed' by uses of tensed sentences. One and the same tensed sentence expresses different propositions at different times of use; and one and the same proposition may be expressed by different tensed sentences, given appropriately different times at which they are used. Others vary the vocabulary a little; they talk not of 'propositions expressed' but of 'statements made'. The tale that Quine has to tell differs in more than vocabulary; for him the real bearers of truth-values are a special sort of *linguistic* item, the 'eternal sentences' of his canonical notation. The differences between these formulations are, from my point of view, less striking than their similarities. For each is but an elaboration of the slogan 'Once a truth, always a truth'; each supposes that if at any time something is true, then it is true at every time. In this section we will show the belief that truth is timeless to be, in all its variants, incoherent.

The argument will run thus. Some truths which can be presented in tensed discourse are such that attempts to frame them in tenseless discourse lead to a manifest nonsense. Eternal sentences fail then to discharge the task of bearing truth-values. They fail because they are eternal and tenseless, rather than because they are sentences. Therefore no other item, whether statement, proposition, or whatever, which is supposed to bear the same truth-value for all time, can rightly be seen as the bearer of truth-values.

The advocates of tenseless discourse offer us this method for moving to it from tensed discourse. A closed sentence of tensed discourse 'Smith is eating' is to be reconstrued as an open sentence 'At t, Smith is eating', where the variable 't' ranges over times. Bind the variable or replace it by the name of a time and you get a closed sentence once more: 'For some t, at t Smith is eating', and 'At noon on 8 February 1979 Smith is eating'. The resultant closed sentences are, if ever true, always so; they are not true at one time only to be false at another.

We have seen that there are truths about the future which may be represented in tensed discourse by sentences of the form $KNFnpNFnNp$. Put thus they are wholly unproblematic; they require no violation of the principles of bivalence, non-contradiction, and excluded middle. What happens however when we try to represent such a truth in tenseless discourse? In place of the tensed p, we have the tenseless 'At t, p', or, as I shall abbreviate it, 'tp'. 'tp' is an open sentence true or false, timelessly, of times. Let 'a' be the name of the moment of time which will take place in n units of time from now. $KNFnpNFnNp$ therefore becomes $KNapNaNp$, 'It is not the case at a that p, nor is it the case at a that not-p', or, to bring out better the predicative character of 'tp', 'It is not the case that a is p-ish, nor is it the case that a is not-p-ish'.

The eternal sentence $KNapNaNp$ is triply dubious. First it contravenes the Law of the Excluded Middle $ApNp$. This, being a law, not only is true now; it will also always be true. In particular it will be true n units from now: $FnApNp$. This fact is presumably to be represented in tenseless discourse as $aApNp$, 'a is either p-ish or not-p-ish'. But this presumably entails $AapaNp$, 'Either a is p-ish or a is not-p-ish', and each member of this disjunction is the contradictory of a member of the conjunction $KNapNaNp$. Secondly, not even abandoning the Law of the Excluded Middle will save the conception of truth as timeless. Even if one does maintain at such a cost that $KNapNaNp$ is not now false, can one with any plausibility suppose that it will remain not false even after a has taken place? Surely not; for *then*, even if not now, one of ap or aNp will be true. But if that is so, the purportedly eternal sentence $KNapNaNp$ changes its truth-value with time. And thirdly, the proponent of eternal sentences contradicts himself directly when he produces the sentence $KNapNaNp$. For $NaNp$, the second member of that conjunction, apparently entails $NNap$, the negation of the first. One might attempt to deny this entailment by appeal to the distinction between internal and external negation. This manoeuvre is however futile, for the distinction is a distinction without a difference in the case of most sentences which consist of a proper name and a predicate. Perhaps there are exceptions where the names are vacuous and so fail to refer to anything; at any rate, on a description theory of names and a Russellian theory of descriptions one can say that the external negation of a sentence consisting of a vacuous name and a predicate is true, and the internal negation just as false as the original. 'a' however is not a vacuous name, unless one wants to say that a doesn't exist on the grounds that a doesn't exist *yet* – something which is itself rather hard to put into tenseless discourse. The apparent contradiction is $KNapNaNp$ is then a real one. And even if 'a' is a vacuous name, it will hardly continue to be vacuous when a actually happens; and then our supposedly eternal sentence will switch from being true to being false.

No eternal sentence can then represent a truth of the form $KNFnpNFnNp$. Eternal sentences cannot therefore be the bearers of truth-values. And the reasoning that we used to refute the claim that they were, can be used to refute any claim that the bearers of truth-values bear the same truth-values unchangingly throughout time. If the corresponding eternal sentence makes something inconsistent out of the unproblematic *KNFnpNFnNp*, a 'proposition expressed' or a 'statement made' by some use of the sentence *KNFnpNFnNp* will likewise be inconsistent. For propositions and statements are in this sense, so far as I can understand the jargon, nothing other than the meanings of eternal sentences.

Truth therefore is not timeless, and truths are tensed in just the way that sentences are. This result does not of itself reveal very much about the nature of the bearers of truth-values. For it is compatible with their being tensed sentences, classes of synonymous tensed sentences, the meanings of tensed sentences, and even with the claim that 'I am sitting' said by me and 'You are sitting' said simultaneously to me express one and the same truth. But whatever account we give of the bearers of truth-values, it will at least have to allow that they can bear different values at different times.

61. What will, I think, provoke most hostility towards my indeterminism is the liberal use that it makes of the concept of necessity. We have called necessary not only truths like the Law of Non-Contradiction, but also truths like 'Caesar is dead', and we have said that these are necessary in exactly the same sense (§ 18), namely true in all possible worlds that are accessible (§ 29). There is however now fashionable among philosophers a belief that there is a distinctive class of truths to be called 'logically necessary', and that these are somehow the only real necessities. Can the indeterminism that we have established allow any truth to this belief?

Nothing in our indeterminism prevents us from distinguishing between logical and other necessities. We may follow Quine[1] and say that a truth is a logical truth if and only if logical vocabulary alone has essential occurrence within it. Thus 'If it is raining, then it is raining' is a logical truth because it cannot be transformed into a falsehood by replacing 'It is raining' with any other sentence, but only by replacing the logical 'If . . . then . . . ' with some other connective such as 'Both . . . and . . . '. We may then add that a proposition is logically necessary if and only if it is, in the defined sense, logically true. Naturally this definition is not of the most exact, for there are familiar difficulties about what to count as logical vocabulary: while the universal quantifier plainly is a piece of logical vocabulary, and 'cow' plainly is not, what about words for identity, necessity and set-membership? Nevertheless, this account of logical necessity clearly rules out as not being logical necessities some of the things that philosophers have been prone to take as prime examples: so-called 'analytic' truths such as 'All bachelors are unmarried men'. That however is no objection to this account. For such truths are plainly not logical truths, and presumably logical necessity implies logical truth.

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[1] W. V. O. Quine 'Truth by convention', in *The Ways of Paradox and Other Essays* (New York 1966).

What however of the thought that logical necessities are the only real necessities? The necessities of logic have a property not shared by all the others. If a truth is logically necessary, it is true at every moment in every course of history that is or ever has been accessible; symbolically, if p is logically necessary then

$$\Pi nPn\Pi mFmp.$$

Not every non-logical necessity has this property; 'Caesar is dead' lacks it. Some other necessary truths do however share this with logically necessary truths. Among them are those truths which would be counted 'analytic', and this is perhaps the explanation why 'analytic' truths too have ineptly been spoken of as logical necessities. Now any proposition which has this feature can justly be seen as inexorably and unshakably true in a way that a proposition such as 'It is day' cannot; for there was a time when that was false, but there never was nor ever will be a time when some bachelors are married men. Some justification can then be found for the thought that what are standardly, albeit not always correctly, called logical necessities have a harder, more substantial, necessity than run-of-the-mill truths. The same justification can also be given for Aristotle's occasional identification of the necessary with the eternal.

The substantial necessity common to logical and 'analytic' truths is not however unique to them. It is possessed also by, for example, propositions recording the laws of nature, and perhaps by some others too. Thus if some principle of the conservation of energy figures among the laws of nature, any truth of the form 'There are exactly *n* units of energy in the universe' will be true at every moment in every course of history if it is true at any moment in any, and so will have this necessity. Some may be surprised at this. The reason for their surprise will be, I think, the belief that whatever possesses the harder and more substantial necessity possessed by logical truths is knowable *a priori*; which the amount of energy in the universe obviously is not. Their belief however has little foundation. For there is little reason to think that every logical truth is knowable; and *a fortiori* even less reason to think that every logical truth is knowable *a priori*. That one cannot know *a priori* the exact amount of energy in the universe does not mean that a truth of the form 'There are exactly *n* units of energy in the universe' lacks the inexorability of logical necessities.

62. Our refutation of determinism will carry more conviction if we show not only that the arguments for determinism are mistaken, but also where they are mistaken. Let us then consider them in turn, beginning with the logical argument for determinism.

This relied on the two premises

$$\Pi p \Pi n A F n p F n N p$$

and

$$\Pi p \Pi n C p P n F n p.$$

In one important respect these two premises come to the same thing. Each premise taken by itself is tantamount to the claim that courses of history never branch towards the future. For if there are now available two courses of history diverging in their futures, the first premise is false; and the second premise is false if there ever were available two such courses of history. It is not surprising then that Aristotle inferred deterministic conclusions from each premise in turn before inferring such conclusions from their conjunction. We have already (§ 50) said enough to show that the first premise cannot be justified as an application of the Law of the Excluded Middle. What however can be said of the second premise? One of the more obvious arguments for it depends on the first. For given that, one could show that courses of history never branch towards the future and thus that the second premise is correct. If this were the only argument for the second premise, our consideration of logical determinism could cease forthwith.

There are however arguments for the second premise which do not invoke the first. For example, I have heard it claimed that if and only if *p* is now true would people ordinarily call true a statement made yesterday to the effect that *p* would be true today. This argument is rather weak. First, what people ordinarily say is not always a reliable guide to what people on reflection ordinarily think; people say things like 'The sun sank into the sea and then the stars came out', but they don't ordinarily believe the astronomy therein. Secondly, even if how people ordinarily speak does express what people ordinarily think, there is some doubt that people do use 'true' in the way that the argument says they do. My own impression is that people prefer, when speaking of statements made in the past about parts of the present that were not then determined, to say that such statements '*came* true' (*scilicet* subsequently) rather than '*were* true' (*scilicet* at the time), and sometimes even to speak of such statements as correct or lucky, rather than as in any way truthful. I cannot claim to have done anything more to verify this impression than conduct a straw poll among some friends of mine who lack a philosophical training; but can those who disagree claim to have done anything more? Thirdly, even if people ordinarily both thought and said that *p* is a sufficient condition for the truth of *PnFnp*, why should we regard their opinions as authoritative? Indeed, if we are to employ this pattern of argument, would it ordinarily be said that tense logicians should treat as authoritative ordinary opinions on the technicalities of their subject?

A better, though still not cogent, argument for the second premise might be given along these lines. If *p* is now true, that surely makes some difference between the two propositions *Fnp* and *FnNp* as asserted *n* units ago. If for example two people had made a bet, the one asserting *Fnp* and the other asserting *FnNp*, it is a sufficient condition for the former to win and the latter to lose that *p* is now true. To say that *Fnp* and *FnNp* were both false *n* units ago is to ignore or deny this difference. This difference therefore requires us to suppose that the former was true then and the latter false; for how otherwise could the one who asserted *Fnp* have won his bet? There is clearly something quite attractive about this argument. Its challenge can however be met. One can suppose that *Fnp* and *FnNp* were both false *n* units ago without denying the difference made by the fact that *p* is now true. We may explain the difference as follows. That *p* is now true entails that *FnNp* was not true then. One of the two betters has therefore had the assertion he made then proved false by the turn events have taken; and this is sufficient for him to lose his bet. The other better, the one who asserted *Fnp*, has not been proved false in this way by the turn events have taken; and this is sufficient for him to win his bet. Nevertheless, the fact that he has not been proved in this way to have asserted a falsehood does not mean that he has been proved to have asserted a truth. In general therefore we may say that if one man asserts *Fnp* and another *FnNp*, it will be the case in *n* units that one and only one of them is proved false by the truth or otherwise then of *p* (to be distinguished from 'One and only one of them is such that: he will be proved false', just as the *de dicto* 'Necessarily: someone wins' is to be distinguished from the *de re* 'Someone is such that: he necessarily wins'). It is because of this that in *n* units time there will turn out to be a difference between the two assertions; and it is because it will then be that only one of them is proved false in this way that the two assertions appear to be contradictories, instead of merely contraries.

63. What of the theological argument for determinism? We saw in § 16 that the theological argument seems to presuppose the success of either the logical or the scientistic argument. Assuming the existence of an omniscient God may then be not only inadequate to prove the truth of determinism, but also superfluous. If on the contrary belief in an omniscient God really does entail determinism, our refutation of determinism can readily be extended into a proof that no rational agent can consistently be a theist. Indeed, our investigations may provide us with more ways than this of proving atheism. For example, no rational agent can consistently be a theist if belief in an omnipotent God entails radical indeterminism, and if no rational agent can consistently be a radical indeterminist (§ 52–53 above). Furthermore, if belief in an omniscient being entails determinism, and if belief in an omnipotent being entails radical indeterminism, then belief in a being both omniscient and omnipotent is self-contradictory. Obviously, this does not refute all theisms; for there are also conceptions of omniscience and omnipotence which enable theists to escape these arguments. But whether those conceptions are the ones that theists typically employ when they talk of a being both omniscient and omnipotent is

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of course another question. If it is to be answered in the negative, our arguments about free will and determinism show that theistic beliefs are typically incoherent.

64. Scientistic arguments were the final kind of argument for determinism. They were in turn divided into an *a priori* and an *a posteriori* argument, the one holding determinism to be a presupposition of science, the other, one of its results.

The *a priori* argument is riddled with error. Let us grant for the moment that scientific activity does indeed have presuppositions that entail determinism. Why however should this prove determinism to anyone who is not himself a scientist? Compare the following argument: religious activities such as worship and preaching presuppose the existence of God, for if God does not exist religion is futile; therefore God exists. The obvious retort for an atheist to make is that so much the worse for religion. Similarly, when faced with the analogous argument from science, the obvious retort for the indeterminist is that in that case so much the worse for science. The second argument is no more rationally compelling to the outsider than is the first. Of course, I am aware that the second might still be found more appealing, for people feel a reverence for science that fortunately few now feel for religion. For instance, no priest could get away with performing in his church as part of some religious rite vivisections of the kind that scientists regularly perform in their laboratories. And again, their colleagues treat with great respect those philosophers who argue that established principles of logic should be modified in order to preserve quantum mechanics; their colleagues would laugh to scorn any philosophers who copied that example and argued that the solution to the problem of evil lay in modifying logic rather than dogma. Such adulation of science may enable this scientistic argument to take in more people than could its religious analogue; I doubt however that that makes it more rationally persuasive. Furthermore, why should even practising scientists accept determinism once they learn that it is entailed by presuppositions made in their scientific activity? Why should not the correct response be rather to abandon science and take up some other trade instead? For in order to avoid contradiction scientists would have to give up either deliberation or science; and the latter course is much the easier. Indeed, one may doubt that it is even possible to persist in doing science without deliberating; for does not someone who wonders what experiment to perform thereby indulge in deliberation?

The argument of the last paragraph granted the assumption that determinism was indeed presupposed by science. But is this assumption correct? Does science presuppose every event to have a cause in the sense that every truth has a deductive-nomological explanation? Certainly science is, at least in part, a quest for understanding; and because explanations confer understanding, in seeking to understand why something is so one seeks an explanation why it is so. But such a search does not presuppose that there is any explanation. If you prospect for gold somewhere you hardly presuppose that there is gold there; at most you presuppose that it is not known that there is no gold in that area. Scientists in asking 'Why is it that p?' do not then presuppose that there is an explanation of p's being true. And even if they did, that would not mean that they supposed *every* truth to have an explanation. For it is not the business of science to ask of each truth p in turn 'Why is it the case that p?'. No scientist shirks his responsibilities if he refuses to join some crank in asking 'Why did my pencil break *on the very same day* that Gromyko visited Havana?'. Furthermore, as that last example should remind us, if science really did presuppose every truth to have a deductive-nomological explanation, it could be shown to be in error anyway, quite apart from considerations about free will and determinism. For the correct answer to such questions as the one about the pencil is 'Coincidence; nothing more'. Now either this answer is itself the explanation or else it denies that any explanation is possible. In neither case does the fact about the pencil have a deductive-nomological explanation. The *a priori* scientistic argument is then wholly inadequate to prove determinism.

Such persuasive power as the *a priori* scientistic argument has may easily be accounted for by our doctrines. I have argued (§ 38 and the preceding sections, especially 34) that theoretical knowledge is never of contingencies, but of necessities alone. A confused apprehension of this truth may easily lead to the belief that in dealing with any subject scientifically, one presupposes that there are no contingencies to do with that subject. I have argued also (§ 39) that there is a sense in which theoretical reason takes as its province every fact that there is. A confused apprehension of this truth may easily lead to the belief that all questions are theoretical questions, and so to be approached scientifically. Once combined these two beliefs easily lead to the third belief that one should approach every question on every subject with the presupposition that that question is not about a contingent matter. And from here to determinism is but a slither. Something like this is, I conjecture, going on in the back of the minds of those who find this scientistic argument for determinism convincing.

65. There remains the *a posteriori* scientistic argument for determinism. This takes the successes of scientists in finding deterministic theories covering some aspects of some things to confirm the hypothesis that they will find deterministic theories covering every aspect of everything, or at least, every aspect of human behaviour. This is a very shaky piece of induction. For even if the discovery of laws governing the movements of planets adds any probability to the belief that laws completely governing the movements of animals will be found, there is also an overwhelming amount of evidence, likewise inductive in character, for the opposite conclusion.

There are several conditions that must be satisfied before one can reasonably claim to know that a proposition records a deterministic law of nature. One of these conditions is that the proposition in question must have been subjected to attempts at falsification, and must have survived all those attempts.[1] Sometimes the only way in which we can attempt to falsify a conjecture is by observation; thus to falsify an astronomical conjecture one can do no more than attempt, perhaps under the guidance of some rival conjecture, to make observations inconsistent with it. In other cases however one can do more to falsify a conjecture than simply be on the alert for counter-examples to it that turn up in the course of nature. Thus to falsify a pharmacological conjecture that some substance is a soporific one may attempt to *contrive* a counter-example by administering the substance to guinea-pigs. When these latter, experimental, tests are available and have not been applied, then the mere fact that a conjecture has passed the former, observational, tests is not enough to justify our accepting it. For one may properly place one's confidence in a conjecture only while it continues to pass the most stringent tests that can be applied to it. Before one can take as established any law about human behaviour one must therefore attempt to contrive counter-examples to it, and must fail in the attempt. If then one has a conjecture that any human being in such-and-such circumstances will do so-and-so, one should if possible place a human being, whether oneself or another, in such-and-such circumstances and try one's best to get him not to do so-and-so. Thus one may regard as corroborated the conjecture that no human being can touch his right elbow with his right hand, on the grounds that one has tried oneself and has got others to try to do that, and not one attempt has ever succeeded.

If this then is one of the conditions that a scientist must meet before he can reasonably claim to have established a law about human nature, there is a mass of inductive evidence

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[1] This condition is given a deservedly great role to play in Karl Popper's philosophy of science. See for example *The Logic of Scientific Discovery* (London 1959) *passim.*

showing that no set of deterministic laws governing every aspect of human behaviour will ever be found. The whole weight of past experience goes to show that unless subject to such things as paralysis or manacles a human being will move his arm if he tries to. The whole weight of past experience then shows that one can easily refute any conjecture that there is some third condition, existing prior to and independently of deliberation, under which no human being will move his arm; for one need but try to falsify it, and one will succeed.

Scientistic determinists show some awareness of this point. They acknowledge it by saying that if a prediction based on a conjectural law of human behaviour is communicated to its subject and if its subject is encouraged to falsify it, then of course one *interferes* with things so as to falsify the prediction and the conjectural law on which it was based. This way of acknowledging the point is meant as a dismissal of it. Scientistic determinists insinuate that such interference is unscientific, that it is the methodological equivalent of shooting foxes to falsify theories in this way, and even that falsifications obtained in this way somehow do not count. These insinuations are thoroughly desperate. They make discovering laws about human behaviour wholly different from discovering laws about other things. In no other field could I claim to have discovered that some propostion records a deterministic law of nature if the only reason why it has not been falsified is that I have not tried to falsify it. Making the discovery of laws about human behaviour so different draws an arbitrary and obscurantist distinction between human beings and the rest of the natural order. The distinction seems especially obscurantist when we reflect that there are plenty of laws about human behaviour which *can* be discovered by the more ordinary method of enlisting the help of one's fellow human beings in the attempt to falsify them; for example, the law that human beings do not levitate. Furthermore, the laws that the scientistic determinist hopes to discover by this

bizarre method will be quite unlike anything discovered by the more ordinary one. For there are no other laws of nature which can be falsified by anyone who has half a mind to falsify them.

The *a posteriori* scientistic argument for determinism is then quite inadequate. Even if the success of, say, a deterministic celestial mechanics does confer some probability on the belief that a set of laws completely governing every aspect of human life will be found, nevertheless there is an overwhelming amount of evidence for the opposite conclusion. For we have overwhelming evidence that there are some things that we will succeed in doing if we try to do them, in all save a few disabling circumstances. Because of this we have overwhelming evidence that no conjectured set of laws governing every aspect of human life will be able to escape falsification if it is subjected to attempts at falsification. And because no such conjecture can be known to be true unless it eludes our best attempts at falsification, we therefore have overwhelming evidence that the progress of science will not lead to the discovery of a set of deterministic laws covering every aspect of everything.

66. Before we broke off to examine the consequences of indeterminism and the defects in the standard deterministic arguments, we had got no further than showing how one may prove to any rational agent that his future actions are undetermined and that he has free will. This however left him free to adopt a novel form of solipsism: free will for himself, but not for others. There are however defects in this solipsism. At the very least, once he admits that rationality requires every other person too to believe that his own will is free, he must admit that there is something to be said for this view of theirs. Furthermore, this novel form of solipsism leads all too readily to a more traditional one. A so-called Principle of Charity governs one's ascriptions to others of beliefs and indeed propositional attitudes in general: one

should not lightly attribute false beliefs to others, and if there is no way of attributing beliefs to something without attributing to it huge numbers of false beliefs, one should not attribute to it any beliefs at all. Doubt that there is such a principle may be removed by pointing out that an analogous principle holds with regard to oneself as well as to others: in putting forward propositions as being among one's own beliefs one should strive to avoid falsehood and maximise truth. Anyone who denies this, saying that he sees no reason for not asserting falsehoods, seems to teeter on the edge of the Liar Paradox: if we are to believe him, then we have reason to disbelieve him; and if we are to disbelieve him, then we have reason to believe him. One should therefore be charitable to oneself. Now in the absence of special reasons to the contrary, one has no grounds for thinking that others are less liable to have attained truth and are more liable to be in error than one is oneself. One should therefore be charitable towards others too, and let the Principle of Charity govern one's ascriptions of beliefs to them. Now one cannot see something as a rational agent without attributing to it as many beliefs entailing its freedom of will as there are occasions on which it deliberates. One can then hardly see something as a rational agent and yet hold that all of these assumptions that it makes are false. The novel form of solipsism therefore commits its holder to the more traditional form that there are no rational agents apart from himself. But traditional solipsism is absurd. It is not inconceivable that only one rational agent exists; for after a nuclear war this might well come true. It is however absurd to think on philosophical principle that there is only one rational agent; for 'rational agent' is a predicate, not a proper name, and is thus in principle applicable to more than one thing. Freedom of the will is therefore to be ascribed to rational agents generally by every rational agent.

67. What about a rational being who is not a rational agent, a being that is who has only theoretical reason? Since he lacks practical reason it can hardly be that he must see himself as having free will. Need he then see as having free will any other rational beings, in particular those other rational beings who are also rational agents? My appeals to assumptions made in the course of deliberation may have given the impression that it is only as practical reasoners that we are committed to libertarianism. Those who find 'practical *reason*' something of a misnomer and think that reason itself is purely theoretical might find this a deficiency in my argument. For they might argue that one need not take seriously those beliefs to which one is committed only as a result of the impurely rational business of deliberation. Let us consider therefore how a being endowed with theoretical reason alone will have to see these matters.

I find the idea of such a being hard to grasp. For reasoning theoretically is, as I know it, an activity; and like any other activity it is subject to the control of practical reason. Thus in reasoning theoretically about the solution to a crossword one reasons also practically, e.g. about whether to start with the anagrams (which one usually finds easy) or with 1 Down (which will give one the initial letters of many other answers). Nevertheless, if there were beings without practical but with theoretical reason they too would, I think, have to agree that all rational agents have free will. For they too would presumably have to employ the Principle of Charity in ascribing beliefs to rational agents. If therefore they saw anyone as a rational agent, they would have to see him as having freewill; and if they saw nobody as a rational agent, then again they would have to suppose that if anyone is a rational agent he has free will. Every rational being then, whether agent or not, should ascribe freedom of will to every rational agent.

68. There might still linger the sceptical thought: of course everyone must *think* that everyone has free will, but might this not be because we are all constrained to be under a

massive and permanent delusion? I do not understand the conception of truth that this doubt presupposes. When rationality alone requires not just this or that person on this or that occasion to believe something, but requires every person on every occasion to believe that thing, how could it be false? Nor do I understand the concept of proof that is presupposed by this doubt. What more could anyone want by way of a proof that he and others have free will than a demonstration of how that follows from premises that he accepts and will abandon only at the cost of death or incoherence? And once he has a proof of this, what more could he want by way of a refutation of its contradictory? Perhaps one might ask also that the premises of the argument be not just idiosyncratic beliefs, peculiar to oneself; but this request also is answered by the proof that we have given. To demand any more of it before accepting this proof as a proof is to deny that there can ever be any proof of anything.

69. What we have established is still very flimsy. For it still does not rule out a position that seems to me incompatible with any very important indeterminacies or any very worthwhile freedom of the will. Put crudely, the position is this: determinism for the physical, but indeterminism and freedom for the mental. Put more precisely, it is this: D is true if one takes the range of *p* and *q* to be restricted to propositions cast entirely in macro-physical terms, but false if one extends their range to include propositions employing mentalistic terms, in that generous but not unwarranted sense whereby action predicates are mentalistic. This position is sometimes adopted as a reconciliation of determinism and free will. The former is restricted to the physical, the latter to the mental, and it is hoped that the two will never meet and conflict. An example will make this position more clear. We may contrast the physical proposition 'My finger is striking the J key' (P), with the mentalistic one 'I am intentionally striking the J key with my finger' (M). Either 'It will be in the next moment that P' or 'It will be in the next moment that not-P' is true, for one or the other of them is entailed by some truth about the present in conjunction with some law. One of the two is necessary, the other impossible. By contrast, neither 'It will be in the next moment that M' nor 'It will be in the next moment that not-M' is true, for neither of them is entailed by some truth about the present in conjunction with some law. It is then a contingent matter whether I will in the next moment strike the J key intentionally with my finger. Which keys get struck when is fully determined; whether I mean to strike them, or strike them only by accident, is not. Perhaps this example will also make it clear why only a paltry amount of freedom is permitted by this position. An indeterminacy in my movings of my fingers is not much when every movement of my fingers is determined.

70. One cannot however admit freedom into the mental realm and stop there without admitting it also into the realm of the physical. For the position that would do this presupposes an extravagant dualism of mind and body. It envisages distinct alternative futures, distinct not in any physical respect whatsoever, but distinct solely in mental ones. Those of many persuasions will find the envisaged alternatives no alternatives at all. Physicalists especially will believe that any difference on the level of the mind is also reflected on the level of physics. But this belief (one might call it minimal materialism) should be acceptable to many others. It neither asserts nor denies that a mental difference is identical with its physical reflection. It neither asserts nor denies that types of mental events and types of physical ones are correlated. It says nothing whatsoever about what causal relations there are between the mental difference and its physical reflection. And it is even compatible with the view that that of which one predicts mental properties is a different substance from that of which one predicates physical properties. Just because

it leaves so many questions open minimal materialism should be quite widely acceptable. (That is why I call it minimal.) It requires then but a weak and near universally acceptable premise to rule out the envisaged alternative futures distinct solely at the mental level. Since there are indeterminacies subject to deliberation, there are therefore physical indeterminacies subject to deliberation. If furthermore the physical reflections of mental differences between alternative futures must occur on a grander scale than that of quantum phenomena, it follows that the laws of macro-scopic physics are not deterministic. That is, there is no set of laws such that D is true when the ranges of '*p*' and '*q*' are restricted to propositions of macro-physics. The physical indeterminacies subject to deliberation are then gross enough to comprise the overt movements of our bodies and whatever is consequent upon them.

71. It is quite compatible with this refutation of physical determinism that the laws of physics are all deterministic in the sense whereby deterministic laws are contrasted with statistical ones. The laws of chess are in something like this sense deterministic rather than statistical. They absolutely rule out certain ways of moving the pieces, and not one of them takes a statistical form, requiring in some circumstances that some move be made only a certain proportion of the time. The laws of chess however do not form a deterministic set in the sense that given any one configuration of pieces on the board they allow only one other configuration to follow; for in all save rare circumstances, they leave several alternatives open. The laws of physics are then, if deterministic, deterministic only in the sense that the laws of chess are. Moreover, as the analogy of chess should also remind us, there is no need to suppose that where the deterministic laws of physics leave several alternatives open these gaps in the deterministic laws are supplemented by statistical ones, specifying the relative frequency with which each of the alternatives

is realised. For example, the relative frequency with which men in certain circumstances perform each of the alternatives open to them need not always tend to any limit. Indeed, our argument of Section 65 can be adapted to show that just as we would be able to falsify any conjectured complete set of deterministic laws, so too we would be able to falsify with equal ease any conjectured set of statistical laws which specified for every alternative in every situation a relative frequency with which that alternative was chosen. Or if not quite with equal ease, then the additional difficulty would be due to the fact that in general it is harder to refute a conjecture that is merely statistical rather than deterministic.

72. Our treatment in the preceding sections of physical determinism should open the way for a physicalism more thoroughgoing than the minimal materialism that was there introduced. For granted minimal materialism, it follows that unless physical determinism is false, there is no *possibility* of making room for freedom of the will by devising distinctions between actions and physical movements, minds and brains, people and bodies, or noumenal and empirical selves. And since physical determinism is false, there is no *need* of such distinctions in order to make room for the freedom of the will. Of course this is no proof of a more thoroughgoing physicalism; indeed, we have yet even to formulate a doctrine worthy of that name. But it does show that there need be no libertarian qualms about materialism, and that we have not proved immaterialism by proving free will.

73. We have then proved the freedom of the will in a sense as strong as promised. We have shown that the actions of rational agents, and therefore some of the motions of their bodies, are determined by their deliberations and by nothing beforehand. But is this sense strong enough? Does proving free will in this sense satisfy the desire which more perhaps

than any other leads philosophers to concern themselves with this issue, the desire to be assured that people are responsible for their actions and may therefore be punished for them? I have deliberately postponed the discussion of responsibility until the very end of this work. For the obsessive concern with responsibility and punishment that many who discuss free will display strikes me as positively unhealthy. Neither conscientiousness nor sadism is an attractive trait; and an especially rebarbative combination of the two can be caught in the anxious tone with which some philosophers, eager to avoid disappointment and yet fearful that it will happen, ask the question that motivates their interest in free will: Can we continue punishing people? With these warnings, let us quell all distaste and examine the bearing of our results on the question of responsibility and punishment.

74. There is a sense in which the truth of determinism would undercut the practice of punishment. This is not because the truth of determinism would mean that anyone who punished another would commit some great wrong. There is an ancient tale of a slave whose master was about to beat him for some delinquency. The slave protested 'Master, you will do great wrong if you beat me. For since every action is determined, it would be most improper for you to complain of, much less punish me for, any of my actions'. Undeterred, the master started to beat his slave, saying 'In that case every action of mine, including this of punishing you, is also determined; and so it is most improper for you to complain of any of them'. The tale puts graphically this obvious yet overlooked point: if determinism entails that no one ever does anything that may justly be complained of, determinism also entails that no infliction of punishment may justly be complained of. This standard fear of determinism is then quite without foundation.

How then would the practice of punishment be undercut by the truth of determinism? It would be undercut in exactly

the same way that any other practice would. If determinism were true, all actions, including the action of punishing, would be founded on an illusion; all action and deliberation would be in error because it presupposed the falsehood that there are some contingencies. It is not then that determinism returns the answer 'No' to the question 'Shall we punish this man?'; it holds rather that the question does not even arise. Our proof of free will therefore saves the practice of punishment from the deterministic objection.

75. Does our proof of free will do any more than this to show that people are responsible for their actions, and so may be punished for them? It is often claimed that indeterminism makes all actions entirely random, and so makes it wrong to punish people. This claim, curiously, is often made as an objection, not to punishment, but to indeterminism. But to see things in that way is to get them the wrong way round. If the claim is correct, what it shows is on the contrary that punishment is unjustified. For indeterminism has been established so firmly that in the event of a conflict between it and the belief that punishment is justified, the latter must yield. And even if indeterminism had not been conclusively established, punishment has not been so conclusively justified that anything which gainsays its justifiability has obviously to be wrong. If therefore the claim is correct, one excuse for making people suffer is removed; and to suppose the opposite, or to be distressed by this consequence of indeterminism, is merely another symptom of how unhealthy is the obsession with responsibility and punishment.

Is there then anything in the claim that the indeterminism which we have proved makes all actions entirely random, and so makes it wrong to punish people for them? Has our indeterminism saved punishment from the threat presented by determinism, only to deal the death-blow itself? It will be worth making a modification to the tale of the master and the slave. The slave says, 'No actions are determined, and so it would be wrong of you to complain about, much less punish me for, anything that I have done.' And the master replies, 'In that case, this action of mine in punishing you was not determined, and so it would be wrong of you to complain about it.' If all actions are rendered immune from complaint by the fact that they are not determined, so too are those actions which consist in inflicting punishment.

76. Nevertheless, indeterminism alone is not enough to make people liable to punishment. The mere fact that it was not always fixed beforehand that something would be so does not of itself make someone responsible for its being so. For that fact alone does nothing to assign the event in question to any one in particular; it could not make one person responsible for the event without making everyone responsible for it, and so everyone would be responsible for everything that had not always been determined in advance. Our proof of free will has however shown more than merely that some happenings have not always been determined in advance. It has shown the existence not just of contingencies (§ 43), but also of contingencies where which of the possibilities comes to pass depends on the outcome of someone's deliberations (§ 45). The fact that some things depend in this way upon people's deliberations gives us the opportunity of constructing an account of responsibility that does not, disastrously, make everyone responsible for everthing that had not always been fixed beforehand. As an initial version of this account we may say that a man is responsible for the realisation of those possibilities the realisation of which depended on his deliberations. This preliminary account requires of course some modifications: if for example one's deliberations were affected by certain kinds of duress or ignorance, one may be able to escape responsibility for something, even though it would not have happened had one's deliberations not taken the course that they did. The details of the qualifications needed will not be examined here. For it hardly takes much examination to tell that among the qualifications needed there will not be one which holds: No one is responsible for something that stems from his deliberations unless every aspect of his deliberations has been fixed for all eternity beforehand. Those determinists who believe their view compatible with people's bearing responsibility for their actions sometimes ask this question: What else could possibly show that people are responsible for their actions if that is not shown by the fact that their actions are caused by their desires and beliefs? Such determinists have a good point. It is a point that we libertarians can borrow. If the fact that a man's actions depend in the right way upon his deliberations does not make him responsible for them, what else could? One can hardly reply that a man is responsible for what depends on his deliberations only when every detail of those deliberations has been determined for all eternity beforehand. The indeterminism that we have proved is then no objection to the claim that people are responsible for what they do, and no impediment to working out the full account of what this responsibility consists in. We know our wills are free, and there's a start on't.

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